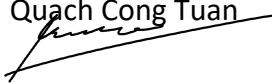


ASSIGNMENT 1

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Student declaration I certify that the assignment submission is entirely my own work and I fully understand the consequences of plagiarism. I understand that making a false declaration is a form of malpractice.			
		Student's signature	Quach Cong Tuan 

Grading grid

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<input type="checkbox"/> Summative Feedback:			<input type="checkbox"/> Resubmission Feedback:		
Grade:			Assessor Signature:		
			Date:		
Internal Verifier's Comments:					
Signature & Date:					

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I. Introduction

In the context of technology 4.0 is gradually developing and transforming into industry 5.0. The technological transformation towards automation and development focuses on enhanced human-machine interaction. This will be one of the things that help businesses grow quickly and reduce a lot of work processes and operating costs.

For this part of my research, I chose the topic of understanding the development of Machine Learning in Internet of Things, or what can be called "AI-ML in IoT".

The recent proliferation of IoT devices and their convergence with cloud-based technologies are making it easier to generate data on building performance – creating a key opportunity for property owners. Building owners apply AI and ML to make critical financial and operational decisions.

Buildings today have evolved into complex connected technology systems that can be operated to maximize efficiencies such as cost savings or improved worker productivity and occupant comfort. Companies like Siemens, PointGrab, Crestron, Aquicore, and others are implementing AI and ML to achieve operational efficiencies that save building owners energy costs or increase productivity in the workplace.

1. Project Title

The Future of Autonomous Vehicles in Artificial Intelligence And The Internet Of Things

2. Abstracts

The convergence of IoT and industrial AI is a worldwide development trend in the 4.0 era. According to surveys and research, people who foresaw are predicted to be 5 times more likely to succeed than those who did not. To predict the future of work, Artificial Intelligence and Machine Learning play an important role in analyzing data and changes.

Statistics regarding the implementation of industrial IoT solutions indicate that early adopters will be able to generate 5 times more revenue than late adopters.

Ideally, companies should focus on narrowing down the business value drivers they are looking to contribute. This way, they can position their digital strategy with business goals in mind to make efficient use of IoT platforms.

3. Situation

In the current context, society is being developed day by day, and people's lives are also in need of improvement thanks to technology applied in people's daily lives.

According to the context of contemporary technical development described in the preceding section. The use of IoT is transforming the commercial landscape of today (Internet of Things). IoT is assisting in acquiring a significant amount of data from numerous sources. But gathering, processing, and analyzing the data is difficult due to the volume of data flowing from so many IoT devices.

It will take an investment in new technology to fully realize the promise of IoT devices in the future. The intersection of AI (Artificial Intelligence) and IoT has the potential to completely reshape how businesses, economies, and sectors operate. IoT powered by AI develops intelligent machines that replicate intelligent behavior and aid in decision-making with little to no human intervention.

Both regular people and specialists gain from the combination of these two streams. AI enables devices to learn from their data and experience, whereas IoT deals with devices interacting through the internet. This study emphasizes the necessity for IoT and AI to collaborate.

4. AI & IOT Functional View

IoT is primarily concerned with machine-implemented sensors that provide data streams via internet access. Create, communicate, aggregate, analyze, and act are the five fundamental stages that all IoT-related services inevitably follow. Unquestionably, the preliminary study determines the "Act's" value. As a result, the precise value of IoT is established at its analysis phase. Here, artificial intelligence technology plays a key role.

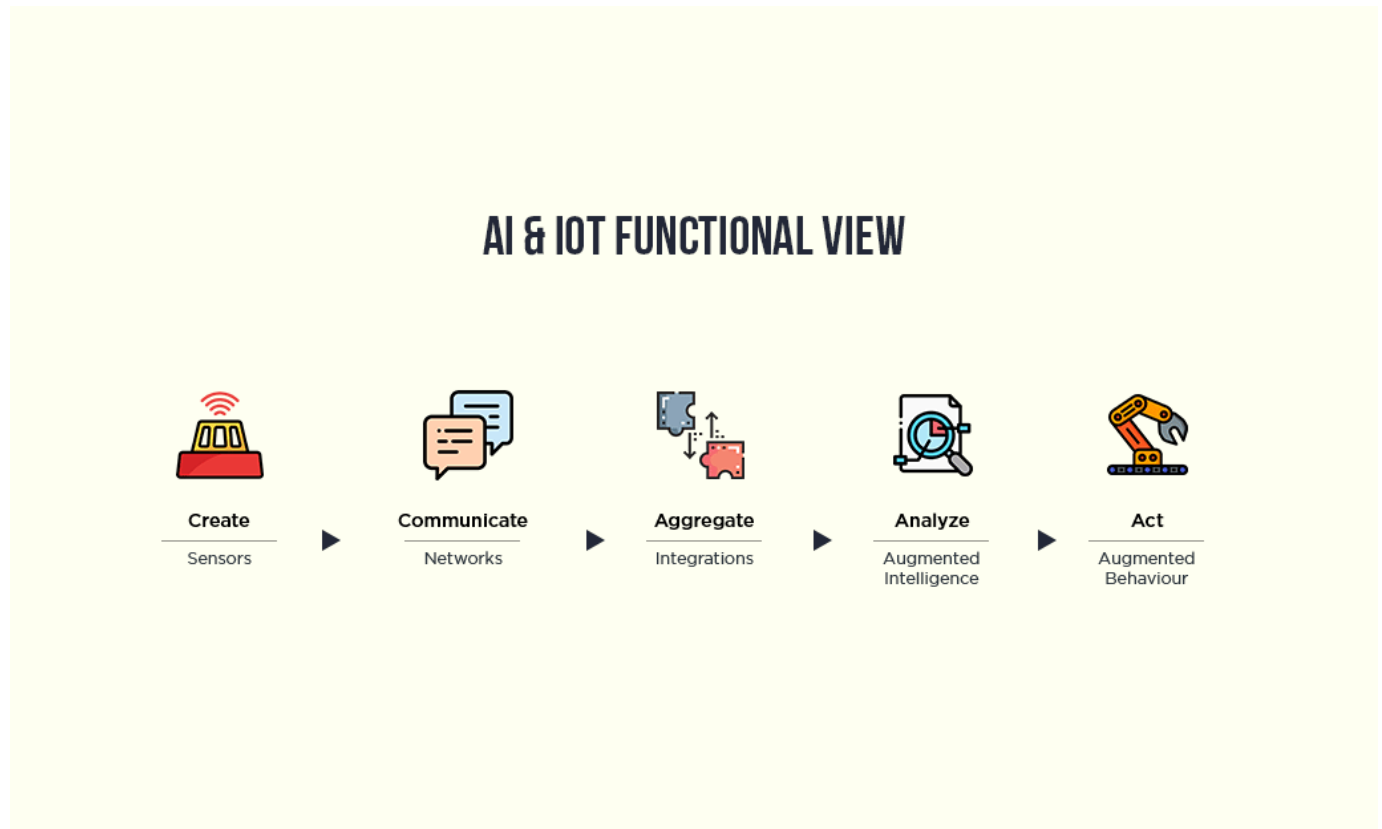


Figure 1 AI & IoT Functional

IoT gives data, but AI has the ability to unlock replies, providing both creativity and context to guide intelligent actions. Businesses can make wise decisions because the data from the sensor may be examined with AI. The IoT with artificial intelligence successfully implements the following adaptable solutions:

- Manage, examine, and draw meaningful conclusions from data.
- Ensure quick and accurate analysis.
- Balance the needs for localized and centralized intelligence
- uphold cybersecurity against cyberattacks

5. Artificial intelligence in internet of things technology

With the deployment of IoT, the business world is changing rapidly. IoT is assisting in the significant capture of a massive amount of data from many sources. Wrapping one's head around the avalanche of data arriving from innumerable IoT devices, on the other hand, makes data collection, processing, and analysis difficult.

Investment in new technologies will be required to realize the future and full potential of IoT devices. The combination of AI (Artificial Intelligence) with the Internet of Things (IoT) has the potential to reshape the way industries, businesses, and economies operate. IoT powered by AI generates intelligent technologies that mimic intelligent behavior and assist in decision-making with little or no human intervention.

(Techopedia, 2019)

II. Literature Review

1. Research Methods

1.1. Primary Research

Primary research is research you conduct yourself (or hire someone to do for you.) It involves going directly to a source – usually customers and prospective customers in your target market – to ask questions and gather information. Examples of primary research are:

- Interviews (telephone or face-to-face)
- Surveys (online or mail)
- Questionnaires (online or mail)
- Focus groups
- Visits to competitors' locations

When you conduct primary research, you're typically gathering two basic kinds of information:

Exploratory. This research is general and open-ended, and typically involves lengthy interviews with an individual or small group. Specific. This research is more precise and is used to solve a problem identified in exploratory research. It involves more structured, formal interviews.

Primary research usually costs more and often takes longer to conduct than secondary research, but it gives conclusive results.

(Ford, 2022)

1.1.1. Types of primary research

There are many ways of gathering primary research. The most suitable method will depend on the questions you want to answer and the problem you're trying to solve. The most common primary market research methods are interviews, surveys, focus groups and observations.

- **Interviews**

Interviews take the form of a one-to-one or small group question and answer session, which can be conducted over the phone or in a face-to-face environment. Interviews are most useful where a large amount of information needs to be collected from a small sample of subjects. Interviews are often used to obtain information from an expert about a specialist topic. This type of research is highly personal, so follow-on questions can be asked to ensure clarity.

- **Surveys**

Surveys are most frequently conducted online using paid or free survey tools and offer a convenient and cost-effective solution where a response is required from a larger population. Questions are pre-written, offering the respondent little flexibility if their answer doesn't fit (making functionality such as skip logic essential) and response rates can be variable. The length of a survey is a delicate balance: if a survey is too long, participants may get bored and leave the survey incomplete. However, if the survey is short, not enough data will be collected to form a full picture.

- **Focus groups**

Focus groups are used to collect data from a small group of people who are often subject matter experts in the topic of research. Discussion is initiated between the group members to discover their thoughts. This method is commonly used by businesses to gain insight into niche markets and learn about their customers.

- **Observations**

Observations are carried out impartially, by simply observing an event and taking organized notes. In this method, there is no direct interaction between the researcher and the subject. This method removes the potential bias which could be encountered during an interview or survey as the encounters observed are genuine reactions. Observations can be carried out by camera or by a trained observer. This method is commonly used by toy manufacturers when testing their products on children.

1.1.2. Advantages of primary research

- One of the most important advantages is, data collected is firsthand and is accurate. In other words, there is no dilution of data. Also, this research method can be customized to suit personal requirements and needs of organizations or businesses.
- Primary research focuses mainly on problem in hand, which means entire attention is directed to find probable solution to a pinpointed subject matter. Primary research allows researchers to go in depth of a matter and study all foreseeable options.
- Data collected can be controlled. Primary research gives a means to control how data is collected and used. It's up to the discretion of businesses or organizations who are collecting data how to best make use of data to get meaningful research insights.
- Primary research is a time-tested method; therefore, one can rely on the results that are obtained from conducting this type of research.

1.1.3. Disadvantages of primary research

- One of the major disadvantages of primary research is, it can be quite expensive to conduct. One may be required to spend a huge sum of money depending on the setup or primary research method used. Not all businesses or organizations may be able to spend a considerable amount of money.
- This type of research can be time-consuming. Conducting interviews, sending and receiving online surveys can be quite an exhaustive process and need investing time and patience for the process to work. Moreover, evaluating results and applying the findings to improve product or service will need additional time.
- Sometimes just using one primary research method may not be enough. In such cases, use of more than one method is required and this might increase both times required to conduct research and the cost associated with it.

1.2. Secondary Research

Secondary research is a type of research that has already been compiled, gathered, organized and published by others. It includes reports and studies by government agencies, trade associations or other businesses in your industry. For small businesses with limited budgets, most research is typically secondary, because it can be obtained faster and more affordably than primary research.

A lot of secondary research is available right on the Web, simply by entering key words and phrases for the type of information you're looking for. You can also obtain secondary research by reading articles in magazines, trade journals and industry publications, by visiting a reference library, and by contacting industry associations or trade organizations.

1.2.1. Conduct Secondary Research

Here are the steps involved in conducting secondary research:



Figure 2 Conduct Secondary Research

- Identify the topic of research: Before beginning secondary research, identify the topic that needs research. Once that's done, list down the research attributes and its purpose.
- Identify research sources: Next, narrow down on the information sources that will provide most relevant data and information applicable to your research.
- Collect existing data: Once the data collection sources are narrowed down, check for any previous data that is available which is closely related to the topic. Data related to research can be obtained from various sources like newspapers, public libraries, government, and non-government agencies etc.
- Combine and compare: Once data is collected, combine, and compare the data for any duplication and assemble data into a usable format. Make sure to collect data from authentic sources. Incorrect data can hamper research severely.

- Analyze data: Analyze data that is collected and identify if all questions are answered. If not, repeat the process if there is a need to dwell further into actionable insights.

1.2.2. Advantages of Secondary Research

- Most information in this research is readily available. There are many sources from which relevant data can be collected and used, unlike primary research, where data needs to be collected from scratch.
- This is a less expensive and less time-consuming process as data required is easily available and doesn't cost much if extracted from authentic sources. A minimum expenditure is associated to obtain data.
- The data that is collected through secondary research, gives organizations or businesses an idea about the effectiveness of primary research. Hence, organizations or businesses can form a hypothesis and evaluate the cost of conducting primary research.
- Secondary research is quicker to conduct because of the availability of data. It can be completed within a few weeks depending on the objective of businesses or the scale of data needed.

1.2.3. Disadvantages of Secondary Research

- Although data is readily available, credibility evaluation must be performed to understand the authenticity of the information available.
- Not all secondary data resources offer the latest reports and statistics. Even when the data is accurate, it may not be updated enough to accommodate recent timelines.
- Secondary research derives its conclusion from collective primary research data. The success of your research will depend, to a greater extent, on the quality of research already conducted by primary research.

(Pro, 2022)

1.3. Compare Primary Research With Secondary Research

Point	Primary Data	Secondary Data
Meaning	Primary data is collected directly from the first-hand experience. This is the information that you gather for the purpose of a particular research project	Secondary data is the data that have been already collected for another purpose. The data is collected by someone else instead of the researcher himself.
Main Sources	Interview, surveys, questionnaires, field observation, experiments, action research, case studies and etc.	Previous research, mass media products, Government reports, official statistics, web information, historical data and etc.
Data time	Real - Time Data	Past Data
Specific to the Researcher Needs	Always specific to the researcher's needs.	Often, it is not specific to the researcher's needs.
Costs	Expensive	Low Cost or Free
Level of the control over data quality	Higher level of control	Lack of control over data quality
Time consuming	More time consuming	Less time consuming
Proprietary Information	You are the owner of the data. Thus, the information can remain hidden from the competitors.	You are not the owner of the data. Your competitors also have access to the data
Capability	More capable to solve a specific problem	Less capable to solve a specific problem

1.4. Qualitative

Qualitative research involves collecting and analyzing non-numerical data (e.g., text, video, or audio) to understand concepts, opinions, or experiences. It can be used to gather in-depth insights into a problem or generate new ideas for research.

Qualitative research is the opposite of quantitative research, which involves collecting and analyzing numerical data for statistical analysis. Qualitative research is commonly used in the humanities and social sciences, in subjects such as anthropology, sociology, education, health sciences, history, etc.

Each of the research approaches involve using one or more data collection methods. These are some of the most common qualitative methods:

- **Observations:** recording what you have seen, heard, or encountered in detailed field notes.
- **Interviews:** personally, asking people questions in one-on-one conversations.
- **Focus groups:** asking questions and generating discussion among a group of people.
- **Surveys:** distributing questionnaires with open-ended questions.
- **Secondary research:** collecting existing data in the form of texts, images, audio or video recordings, etc.

1.4.1. Qualitative data analysis

Qualitative data can take the form of texts, photos, videos and audio. For example, you might be working with interview transcripts, survey responses, fieldnotes, or recordings from natural settings.

Most types of qualitative data analysis share the same five steps:

- Prepare and organize your data. This may mean transcribing interviews or typing up fieldnotes.
- Review and explore your data. Examine the data for patterns or repeated ideas that emerge.
- Develop a data coding system. Based on your initial ideas, establish a set of codes that you can apply to categorize your data.
- Assign codes to the data. For example, in qualitative survey analysis, this may mean going through each participant's responses and tagging them with codes in a spreadsheet. As you go through your data, you can create new codes to add to your system if necessary.
- Identify recurring themes. Link codes together into cohesive, overarching themes.

There are several specific approaches to analyzing qualitative data. Although these methods share similar processes, they emphasize different concepts.

1.4.2. Advantages of qualitative research

Qualitative research often tries to preserve the voice and perspective of participants and can be adjusted as new research questions arise. Qualitative research is good for:

- **Flexibility:** The data collection and analysis process can be adapted as new ideas or patterns emerge. They are not rigidly decided beforehand.
- **Natural settings:** Data collection occurs in real-world contexts or in naturalistic ways.
- **Meaningful insights:** Detailed descriptions of people's experiences, feelings and perceptions can be used in designing, testing, or improving systems or products.
- **Generation of new ideas:** Open-ended responses mean that researchers can uncover novel problems or opportunities that they wouldn't have thought of otherwise.

1.4.3. Disadvantages of qualitative research

Researchers must consider practical and theoretical limitations in analyzing and interpreting their data. Qualitative research suffers from:

- **Unreliability:** The real-world setting often makes qualitative research unreliable because of uncontrolled factors that affect the data.
- **Subjectivity:** Due to the researcher's primary role in analyzing and interpreting data, qualitative research cannot be replicated. The researcher decides what is important and what is irrelevant in data analysis, so interpretations of the same data can vary greatly.
- **Limited generalizability:** Small samples are often used to gather detailed data about specific contexts. Despite rigorous analysis procedures, it is difficult to draw generalizable conclusions because the data may be biased and unrepresentative of the wider population.
- **Labor-intensive:** Although software can be used to manage and record large amounts of text, data analysis often must be checked or performed manually.

1.5. Quantitative

Quantitative research is the process of collecting and analyzing numerical data. It can be used to find patterns and averages, make predictions, test causal relationships, and generalize results to wider populations.

Quantitative research is the opposite of qualitative research, which involves collecting and analyzing non-numerical data (e.g., text, video, or audio).

Quantitative research is widely used in the natural and social sciences: biology, chemistry, psychology, economics, sociology, marketing, etc.

You can use quantitative research methods for descriptive, correlational or experimental research.

- In descriptive research, you simply seek an overall summary of your study variables.
- In correlational research, you investigate relationships between your study variables.
- In experimental research, you systematically examine whether there is a cause-and-effect relationship between variables.

Correlational and experimental research can both be used to formally test hypotheses, or predictions, using statistics. The results may be generalized to broader populations based on the sampling method used.

To collect quantitative data, you will often need to use operational definitions that translate abstract concepts (e.g., mood) into observable and quantifiable measures (e.g., self-ratings of feelings and energy levels).

1.5.1. Quantitative data analysis

Once data is collected, you may need to process it before it can be analyzed. For example, survey and test data may need to be transformed from words to numbers. Then, you can use statistical analysis to answer your research questions.

Descriptive statistics will give you a summary of your data and include measures of averages and variability. You can also use graphs, scatter plots and frequency tables to visualize your data and check for any trends or outliers.

Using **inferential statistics**, you can make predictions or generalizations based on your data. You can test your hypothesis or use your sample data to estimate the population parameter.

Advantages of quantitative research

Quantitative research is often used to standardize data collection and generalize findings. Strengths of this approach include:

- **Replication:** Repeating the study is possible because of standardized data collection protocols and tangible definitions of abstract concepts.
- **Direct comparisons of results:** The study can be reproduced in other cultural settings, times or with different groups of participants. Results can be compared statistically.
- **Large samples:** Data from large samples can be processed and analyzed using reliable and consistent procedures through quantitative data analysis.
- **Hypothesis testing:** Using formalized and established hypothesis testing procedures means that you have to carefully consider and report your research variables, predictions, data collection and testing methods before coming to a conclusion.

Disadvantages of quantitative research

Despite the benefits of quantitative research, it is sometimes inadequate in explaining complex research topics. Its limitations include:

- **Superficiality:** Using precise and restrictive operational definitions may inadequately represent complex concepts. For example, the concept of mood may be represented with just a number in quantitative research but explained with elaboration in qualitative research.
- **Narrow focus:** Predetermined variables and measurement procedures can mean that you ignore other relevant observations.
- **Structural bias:** Despite standardized procedures, structural biases can still affect quantitative research. Missing data, imprecise measurements or inappropriate sampling methods are biases that can lead to the wrong conclusions.
- **Lack of context:** Quantitative research often uses unnatural settings like laboratories or fails to consider historical and cultural contexts that may affect data collection and results.

1.6. Compare Qualitative With Quantitative

The basic differences between qualitative research methods and quantitative research methods are simple and straightforward. They differ in:

- Their analytical objectives
- Types of questions asked
- Types of data collection instruments
- Forms of data they produce
- Degree of flexibility

Attributes	Qualitative research methods	Quantitative research methods
Analytical objectives	This research method focuses on describing individual experiences and beliefs.	Quantitative research method focuses on describing the characteristics of a population.
Types of questions asked	Open-ended questions	Closed-ended questions
Data collection Instrument	Use semi-structured methods such as in-depth interviews, focus groups, and participant observation	Use highly structured methods such as structured observation using questionnaires and surveys
Form of data produced	Descriptive data	Numerical data
Degree of flexibility	Participant responses affect how, and which questions researchers ask next	Participant responses do not influence or determine how, and which questions researchers ask next

Quantitative data is structured and accountable. This type of data is formatted in a way so it can be organized, arranged, and searchable. Qualitative data is considered unstructured. This type of data is formatted (and known for) being subjective, individualized, and personalized. Anything goes. Because of this, qualitative data is inferior if it's the only data in the study.

Because quantitative data is more concrete, it's generally preferred for data analysis. Numbers don't lie. But for complete statistical analysis, using both qualitative and quantitative yields the best results.

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1.7.1. The scientific method in technology and computers

The scientific method is incredibly valuable in technology and related fields. It is obviously used in research and development, but it is also useful in day-to-day operations. Because almost everything can be quantified, testing hypotheses can be easy.

Most modern computer systems are complicated and difficult to troubleshoot. Using the scientific method of hypothesis and testing can greatly simplify the process of tracking down errors and it can help find areas of improvement. It can also help when you evaluate new technologies before implementation.

1.7.2. Steps of the scientific method

The scientific method uses a series of steps to establish facts or create knowledge. The overall process is well established, but the specifics of each step may change depending on what is being examined and who is performing it. The scientific method can only answer questions that can be proven or disproven through testing.

Step 1: See or ask a question: The first step is to observe something that you would like to learn about or ask a question that you would like answered. These can be specific or general. Some examples would be "I observe that our total available network bandwidth drops at noon every weekday" or "How can we increase our website registration numbers?" Taking the time to establish a well-defined question will help you in later steps.

Step 2: Gather background information: This involves doing research into what is already known about the topic. This can also involve finding if anyone has already asked the same question.

Step 3: Create a hypothesis: A hypothesis is an explanation for the observation or question. If proven later, it can become a fact. Some examples would be "Our employees watching online videos during lunch is using our internet bandwidth" or "Our website visitors don't see our registration form."

Step 4: Create a prediction and perform a test: Create a testable prediction based on the hypothesis. The test should establish a noticeable change that can be measured or observed using empirical analysis. It is also important to control for other variables during the test. Some examples would be "If we block video-sharing sites, our available bandwidth will not go down significantly during lunch" or "If we make our registration box bigger, a greater percentage of visitors will register for our website than before the change."

Step 5: Analyze the results and draw a conclusion: Use the metrics established before the test see if the results match the prediction. For example, "After blocking video-sharing sites, our bandwidth utilization only went down by 10% from before; this is not enough of a change to be the primary cause of the network congestion" or "After increasing the size of the registration box, the percent of sign-ups went from 2% of total page views to 5%, showing that making the box larger results in more registrations."

Step 6: Share the conclusion or decide what question to ask next: Document the results of your experiment. By sharing the results with others, you also increase the total body of knowledge available. Your experiment may have also led to other questions, or if your hypothesis is disproven you may need to create a new one and test that. For example, "Because user activity is not the cause of excessive bandwidth use, we now suspect that an automated process is running at noon every day."

1.8. Research Process

The research process consists of a series of systematic procedures that a researcher must go through in order to generate knowledge that will be considered valuable by the project and focus on the relevant topic.

To conduct effective research, you must understand the research process steps and follow them. Here are a few steps in the research process to make it easier for you:

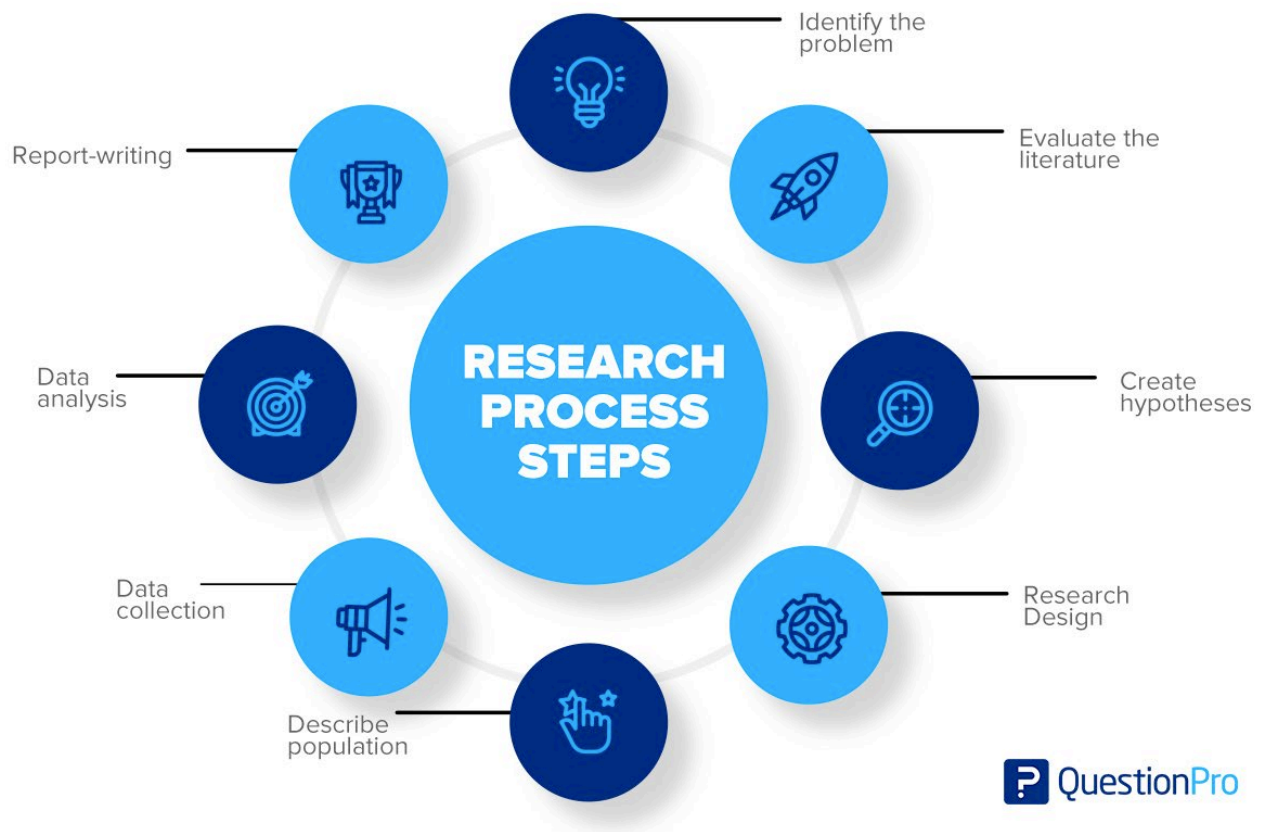


Figure 4 Research Process

Step 1: Identify the Problem

Finding an issue or formulating a research question is the first step. A well-defined problem will guide the researcher through all stages of the research process, from setting objectives to choosing a technique. There are a number of approaches to get insight into a topic and gain a better understanding of it. Such as:

- A preliminary survey
- Case studies
- Interviews with a small group of people
- Observational survey

Step 2: Evaluate the Literature

A thorough examination of the relevant studies is essential to the research process. It enables the researcher to identify the precise aspects of the problem. Once a problem has been found, the investigator or researcher needs to find out more about it.

This stage gives problem-zone background. It teaches the investigator about previous research, how they were conducted, and its conclusions. The researcher can build consistency between his work and others through a literature review. Such a review exposes the researcher to a more significant body of knowledge and helps him follow the research process efficiently.

Step 3: Create Hypotheses

Formulating an original hypothesis is the next logical step after narrowing down the research topic and defining it. A belief solves logical relationships between variables. In order to establish a hypothesis, a researcher must have a certain amount of expertise in the field.

It is important for researchers to keep in mind while formulating a hypothesis that it must be based on the research topic. Researchers are able to concentrate their efforts and stay committed to their objectives when they develop theories to guide their work.

Step 4: The Research Design

Research design is the plan for achieving objectives and answering research questions. It outlines how to get the relevant information. Its goal is to design research to test hypotheses, address the research questions, and provide decision-making insights.

The research design aims to minimize the time, money, and effort required to acquire meaningful evidence. This plan fits into four categories:

- Exploration and Surveys
- Experiment
- Data Analysis
- Observation

Step 5: Describe Population

Research projects usually look at a specific group of people, facilities, or how technology is used in the business. In research, the term population refers to this study group. The research topic and purpose help determine the study group.

Suppose a researcher wishes to investigate a certain group of people in the community. In that case, the research could target a specific age group, males or females, a geographic location, or an ethnic group. A final step in a study's design is to specify its sample or population so that the results may be generalized.

Step 6: Data Collection

Data collection is important in obtaining the knowledge or information required to answer the research issue. Every research collected data, either from the literature or the people being studied. Data must be collected from the two categories of researchers. These sources may provide primary data.

- Experiment
- Questionnaire
- Observation
- Interview

Secondary data categories are:

- Literature survey
- Official, unofficial reports
- An approach based on library resources

Step 7: Data Analysis

During research design, the researcher plans data analysis. After collecting data, the researcher analyzes it. The data is examined based on the approach in this step. The research findings are reviewed and reported.

Data analysis involves a number of closely related stages, such as setting up categories, applying these categories to raw data through coding and tabulation, and then drawing statistical conclusions. The researcher can examine the acquired data using a variety of statistical methods.

Step 8: The Report-writing

After completing these steps, the researcher must prepare a report detailing his findings. The report must be carefully composed with the following in mind:

- The Layout: On the first page, the title, date, acknowledgments, and preface should be on the report. A table of contents should be followed by a list of tables, graphs, and charts if any.
- Introduction: It should state the research's purpose and methods. This section should include the study's scope and limits.
- Summary of Findings: A non-technical summary of findings and recommendations will follow the introduction. The findings should be summarized if they're lengthy.
- Principal Report: The main body of the report should make sense and be broken up into sections that are easy to understand.
- Conclusion: The researcher should restate his findings at the end of the main text. It's the final result.

1.9. Population In Research

A population is the entire group that you want to draw conclusions about.

In research, a population doesn't always refer to people. It can mean a group containing elements of anything you want to study, such as objects, events, organizations, countries, species, organisms, etc.

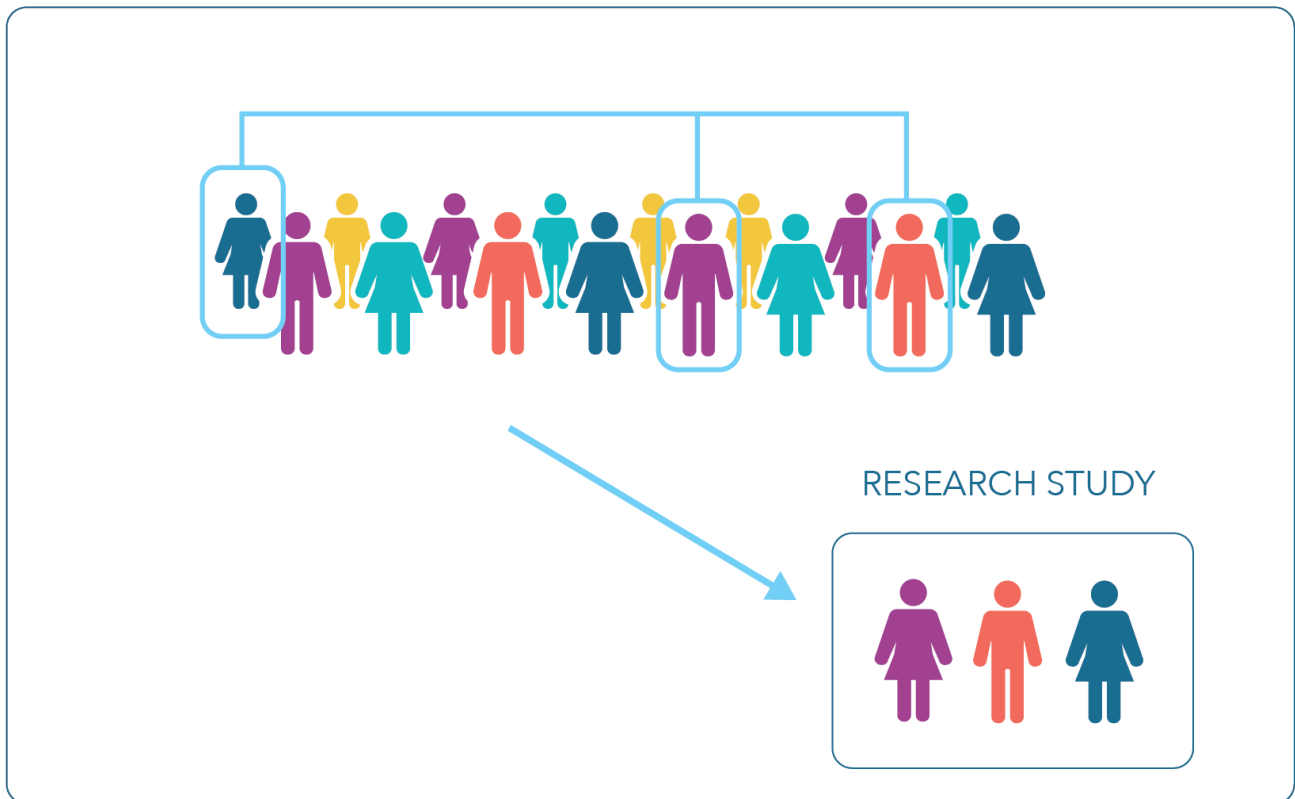


Figure 5 Population Research

1.9.1. Collecting data from a population

Populations are used when your research question requires, or when you have access to, data from every member of the population. Usually, it is only straightforward to collect data from a whole population when it is small, accessible, and cooperative.

For larger and more dispersed populations, it is often difficult or impossible to collect data from every individual. For example, every 10 years, the federal US government aims to count every person living in the country using the US Census. This data is used to distribute funding across the nation.

However, historically, marginalized, and low-income groups have been difficult to contact, locate and encourage participation from. Because of non-responses, the population count is incomplete and biased towards some groups, which results in disproportionate funding across the country.

In cases like this, sampling can be used to make more precise inferences about the population.

2. Research Method Can Be Used To Carried Out

In this research paper, I will combine both research methods including secondary research, and primary research. In which to collect data and information in the most effective way, I will combine qualitative and quantitative research to clarify and get the best quality and closest surveys to the research problem. The methods are all done by me, and I will explain them in the following section.

Quantitative information is organized and responsible. This kind of data is prepared to provide organization, arrangement, and searchability.

Unstructured data is what qualitative data is. This kind of information is formatted (and is renowned for being) personalized, subjective, and personalized. It's open season. Because of this, using only qualitative data in a study is poor. It is still valuable, though.

In general, quantitative data is preferable for data analysis since it is more tangible. Numbers are reliable. However, combining qualitative and quantitative methods produces the most accurate findings for complete statistical analysis.



Figure 6 Research Method Can Be Used

3. Secondary Research

3.1. Definition of Internet of Things

Artificial intelligence of things (AIoT) is a broad term for applying artificial intelligence to the internet of things (IoT), a new phenomenon that represents many simple digital connections between hardware devices. The internet of things is comprised of billions of small, connected devices, including traditional devices and appliances networked together and communicating over internet protocols. Adding AI to IoT brings its own system of challenges and potential solutions.

Artificial intelligence of things represents technologies that are built into the IoT to make it smart. AI can add value in helping IoT achieve machine learning goals or in using key data for signaling or developing insights. Where data analysis on the internet of things is automated, it constitutes artificial intelligence of things. Companies and other parties are talking about artificial intelligence of things when they talk about efforts to broaden what users can do over the internet of things or how technologies can utilize the internet of things to function.

(Chukwudozie, 2022)

3.2. AI in IoT with Autonomous Vehicles

For the record, AI and cars have a mutual history, and it was the dream of scientists to create intelligent machines that could think and act for themselves which gave birth to autonomous vehicles, or self-driving cars, which have turned out to become one of the best innovations of AI technology.

With detection algorithms

Autonomous vehicles have neural networks and specific algorithms. These are Artificial Intelligence (AI) and Machine Language (ML) based object detection algorithms. These serve to collect data, analyze objects, and make accurate decisions while on the road. These features also enable these intelligent machines to provide solutions to problems occurring in advance of real time by predicting events through the swift processing of data.

With autopilots

Quite recently, Tesla manufactured electric cars that are self-driving and equipped with autopilots to enable automatic steering, accelerating braking, lane changing, and parking actions. Added to these features is the fact that these cars have the potential to reduce emissions globally, a milestone achievement from fuel-driven vehicles. Today, autonomous vehicles can be found in some of the biggest cities of the world. Even heavy-duty trucks without drivers that can deliver goods over long distances have been manufactured. This has not only reduced transportation costs significantly but also reduced the loss of human lives through accidents, much of which arise from human errors.



Figure 7 Autonomous Vehicles

3.3. The challenges for the definitive implementation of autonomous vehicles

In the first place, the Internet of Things (IoT), connected technology and Artificial Intelligence (AI) have driven major changes in society. The IoT will provide vehicles with real-time data that will help them detect operational problems and understand environmental conditions. In addition, 5G technology's arrival presents an opportunity to advance the field of connected technology and boost the establishment of such vehicles in the market. Even so, there are many technologies needed to make autonomous vehicles possible, and research must continue advancing in the fields of cloud technology, cybersecurity, robotics, space navigation, lasers and photography for the now-not-so-futuristic invention to become a reality.

In the second place, the biggest challenge facing these vehicles is to ensure reasonable decisions are made by the robotized vehicles. This challenge involves not only technology, but also disparate areas like philosophy, ethics and legal regulation. Consequently, a new concept has emerged from the fusion of philosophy and technology – that of robotics.

Robotics is a form of applied ethics that looks at the positive and negative implications of robotics for individuals and society. It aims to inspire the design of so-called smart or autonomous robots and prevent their misuse against humankind. If vehicles can circulate completely autonomously, they must also be able to make complicated fraction-of-a-second decisions, such as deciding between striking a child or injuring the car's occupants to save the child. These are real ethical concerns that need to be appropriately addressed by professionals, such as philosophers, and soon it will not be uncommon for tech companies to start using such professionals to assist engineers in developing algorithms that define robot behavior.

Additionally, the different cultural mindsets of the users of these future robots must be factored into these ethical assessments when programming. Moral judgements are strongly influenced by one's culture – as demonstrated by "Moral Machine", an online game developed by the Massachusetts Institute of Technology (MIT).

(Chukwudozie, 2022)

3.4. AIs and IoT in FPT Corporation's automated vehicles

As Mr. Pham Quang Viet - FPT Software engineer said, ZED's camera system is a combination of a camera system to be able to analyze the depth of pixels.

- As for Lidar, it's a 360-camera device that can scan around 100 - 150m.
- In the car, the kit of NVIDIA is used - this graphics chip will optimize pixels and use Deep Learning
- The car uses the most advanced technologies and techniques such as Path Planning, Behavior cloning, lidar, and deep learning researched by FPT Software.

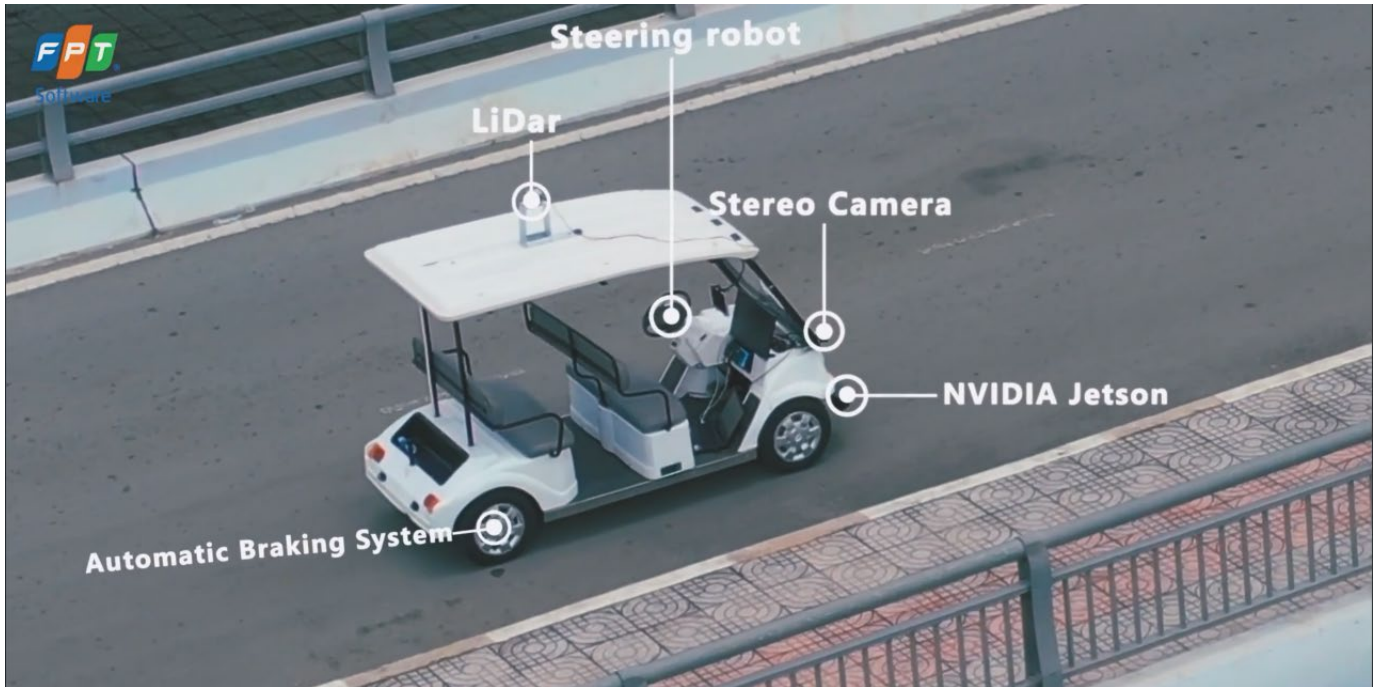


Figure 8 AIs and IoT with FPT Software]

How it Works and Processes Information:

The driver will use this vehicle, then the system will collect data and behavior and then automatically train. That data after training will automatically be loaded back into the car. And when the car moves, it will automatically collect pixels from the camera and feed it into data, and then the AI will automatically analyze and decide on how to move reasonably and close to the driver.

3.5. How do autonomous cars work?

Autonomous cars rely on sensors, actuators, complex algorithms, machine learning systems, and powerful processors to execute software.

Autonomous cars create and maintain a map of their surroundings based on a variety of sensors situated in different parts of the vehicle. Radar sensors monitor the position of nearby vehicles. Video cameras detect traffic lights, read road signs, track other vehicles, and look for pedestrians. Lidar (light detection and ranging) sensors bounce pulses of light off the car's surroundings to measure distances, detect road edges, and identify lane markings. Ultrasonic sensors in the wheels detect curbs and other vehicles when parking.

Sophisticated software then processes all this sensory input, plots a path, and sends instructions to the car's actuators, which control acceleration, braking, and steering. Hard-coded rules, obstacle avoidance algorithms, predictive modeling, and object recognition help the software follow traffic rules and navigate obstacles.

(team, 2022)



3.6. Challenges and future with autonomous cars

Fully autonomous (Level 5) cars are undergoing testing in several pockets of the world, but none are yet available to the general public. We're still years away from that. The challenges range from the technological and legislative to the environmental and philosophical. Here are just some of the unknowns.

3.6.1. Lidar and Radar

Lidar is expensive and is still trying to strike the right balance between range and resolution. If multiple autonomous cars were to drive on the same road, would their lidar signals interfere with one another? And if multiple radio frequencies are available, will the frequency range be enough to support mass production of autonomous cars?

3.6.2. Weather Conditions

What happens when an autonomous car drives in heavy precipitation? If there's a layer of snow on the road, lane dividers disappear. How will the cameras and sensors track lane markings if the markings are obscured by water, oil, ice, or debris?

3.6.3. Traffic Conditions and Laws

Will autonomous cars have trouble in tunnels or on bridges? How will they do in bumper-to-bumper traffic? Will autonomous cars be relegated to a specific lane? Will they be granted carpool lane access? And what about the fleet of legacy cars still sharing the roadways for the next 20 or 30 years?

3.6.4. State vs. Federal Regulation

The regulatory process in the U.S. has recently shifted from federal guidance to state-by-state mandates for autonomous cars. Some states have even proposed a per-mile tax on autonomous vehicles to prevent the rise of "zombie cars" driving around without passengers. Lawmakers have also written bills proposing that all autonomous cars must be zero-emission vehicles and have a panic button installed. But are the laws going to be different from state to state? Will you be able to cross state lines with an autonomous car?

3.6.5. Accident Liability

Who is liable for accidents caused by an autonomous car? The manufacturer? The human passenger? The latest blueprints suggest that a fully autonomous Level 5 car will not have a dashboard or a steering wheel, so a human passenger would not even have the option to take control of the vehicle in an emergency.

3.6.6. Artificial vs. Emotional Intelligence

Human drivers rely on subtle cues and non-verbal communication—like making eye contact with pedestrians or reading the facial expressions and body language of other drivers—to make split-second judgment calls and predict behaviors. Will autonomous cars be able to replicate this connection? Will they have the same life-saving instincts as human drivers?

(FPT Software, 2021)

3.7. Conclusion & Hypothesis

As secondary research and research papers have been outlined above. Artificial intelligence in the internet of things technology is gradually being developed based on many different fields. The steps of AI in life are gradually being synchronized and developed more. In this 4.0 revolution, technology will have to be developed and optimized for the system to create a convenient, fast and accurate user experience.

Therefore, there are no connectivity issues and no security holes once the technologies required to connect autonomous vehicles with one another and with the outside world are fully developed and implemented. network, we'll be able to start creating these automobiles and examine the moral dilemmas associated with giving machines the ability to make judgments. However, we frequently encounter various set ups and legal frameworks depending on the nation we are in and do not yet have a uniform worldwide ethic to demand.

According to my personal research in Vietnam, technology corporations like FPT or Viettel have been actively analyzing 5G technology for a long time. We believe that 5G networks offer tremendous opportunities and can open new markets for telecommunications, for example in areas such as connected vehicles. Therefore, corporations FPT and Viettel rank this technology as a “5G challenge”.

Hypothesis

A self-driving automobile is a private or public vehicle that employs sensors, cameras, radar, and artificial intelligence (AI) to observe, evaluate, and interpret its surroundings by segmenting it into objects (obstacles, pedestrians), navigability, and other variables (road, pavement, etc.). This route enables it to create various navigation methods, travel between locations, or carry out particular maneuvers without a human operator.

A functional classification of vehicle automation into five stages, each of which corresponds to a higher level of automation, has been agreed upon by the automotive industry and the Society of Automotive Engineers in order to meet this goal.

- Level 1 driver assistance allows the car to control either the steering or the braking, but not at once.
- Level 2 partial automation allows for simultaneous steering and brake assistance, but you must always keep your eyes on the road. Examples include General Motors' Super Cruise and Tesla's Autopilot.
- Conditional automation, or Level 3, enables the automobile to handle most driving-related tasks while allowing the driver to momentarily take their eyes off the road.
- Advanced automation, or Level 4, allows the automobile to take complete control under specific circumstances, freeing the driver to concentrate on other duties.
- Level 5 represents complete automation. In this fictitious scenario, the vehicle can operate without a driver or even a steering wheel.

However, in Vietnam at the moment, there is no technology unit that can autonomously develop automatic vehicles above level 3. Anyway, for terrain, the locality is complicated in terms of nature. We can also see that reaching level 3 is a step in the development and progress of Vietnam's technology industry.

III. Primary Research

1. Conduct primary research and result evaluation

In my research paper, to do primary research, I chose to create a survey in google form so that I can have accurate information and data. With the online survey, I believe that people can fill out and respond remotely and answer about their experience. My online survey will open in 07 days. Then I will lock the form so that I can have the most accurate and most accurate survey results. Link Survey here: <https://forms.gle/KYF8oQNK6bTLwjfT7>

- Start Date: 17/10/2022
- End Date: 24/10/2022



The Future of Autonomous Vehicles in Artificial Intelligence and The Internet of Things

The topic of self-driving cars is controversial. To some, it may seem like a positive technology that removes the stress of driving or that allows you to spend your time doing better things. To others, letting technology take the wheel may seem risky, or even dangerous. Find out if people are on board with the technology using this self-driving cars survey template. Use the template as is to get quick feedback or customize it to narrow in on specifics like different driving scenarios or car brands.

- Quach Cong Tuan -

Do you think automotive safety regulations are strict enough, or could be improved? *

- ☐ Strict enough
- ☐ Could be improved

Figure 9 Question 1

How much have you heard about self-driving cars? *

- ☐ A lot
- ☐ Some
- ☐ Not much

Figure 10 Question 2

How safe would you feel being a passenger in a self-driving car? *

- ☐ Extremely safe
- ☐ Very safe
- ☐ Somewhat safe
- ☐ Not so safe

Figure 11 Question 3

How likely are you to purchase a self-driving car once the technology is fully developed? *

- ☐ Extremely likely
- ☐ Very likely
- ☐ Somewhat likely
- ☐ Not so likely

Figure 12 Question 4

Do you think using automated vehicles will help in the future? *

Please rate on the scale below from 1 to 5 with your satisfaction level.

	1	2	3	4	5	
Futile	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Useful

Figure 13 Question 5

What factors do you think would make an automated vehicle the most useful? *

- ☐ Speed
- ☐ Convenient
- ☐ Safe
- ☐ Fast

Figure 14 Question 6

Do you expect that automated vehicles will become more common in life? *

- ☐ Yes
- ☐ No

Figure 15 Question 7

After the above survey, I continued to conduct an interview program for those who have experienced and used technology for longtime drivers and newbies.

In the list of survey participants, we will choose to publicize the information and survey results of some participants after asking their opinions:

- Mr. Pham Hoang Minh | Taxi driver
- Mr. Dao Viet Anh | Tech taxi driver
- Mr. Pham Duc My | FPT Student
- Mr. Nguyen Quoc Huy | FPT Student
- Mr. Nguyen Van Manh | FPT Student

Here are some of the questions we have for interviews:

1. How often do you drive?
2. What do you think if there is a vehicle that automatically moves and joins traffic?
3. Do you think it is safe for everyone?
4. Does it matter if an automatic car enters traffic?
5. Do you wish and think that this automatic car will improve the quality of life as well as more convenience?

1.1. Result evaluation

After collecting the data, we have the general assessment of the survey and interview results as follows:

1.1.1. Survey

Do you think automotive safety regulations are strict enough, or could be improved?

21 responses

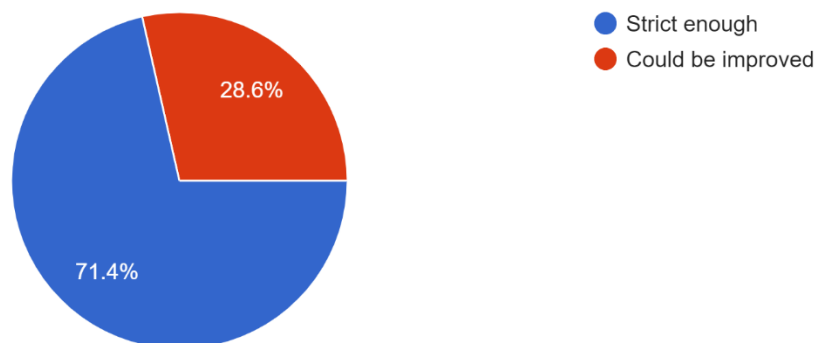


Figure 16 Question 8

Based on the survey assessment, I found that 71.4% of survey respondents rated the level of safety as strict enough and besides, and 28.6% of them think that we need to improve more on safety regulations.

How much have you heard about self-driving cars?

21 responses

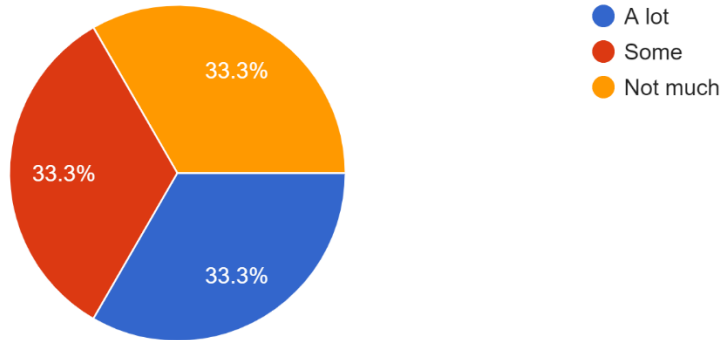


Figure 17 Question 9

According to the survey, 33.3% is a number that is evenly divided among choices such as many, many, and not many. Most people have also heard of and mentioned automated vehicles.

How safe would you feel being a passenger in a self-driving car?

21 responses

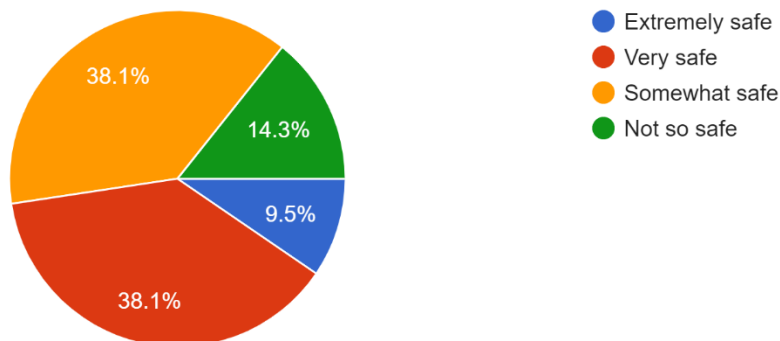


Figure 18 Question 10

According to the survey, we found that the extremely safe rating only accounted for 9.5% of the reviewers. And most people choose moderate and moderate safety.

Do you think using automated vehicles will help in the future? Please rate on the scale below from 1 to 5 with your satisfaction level.

21 responses

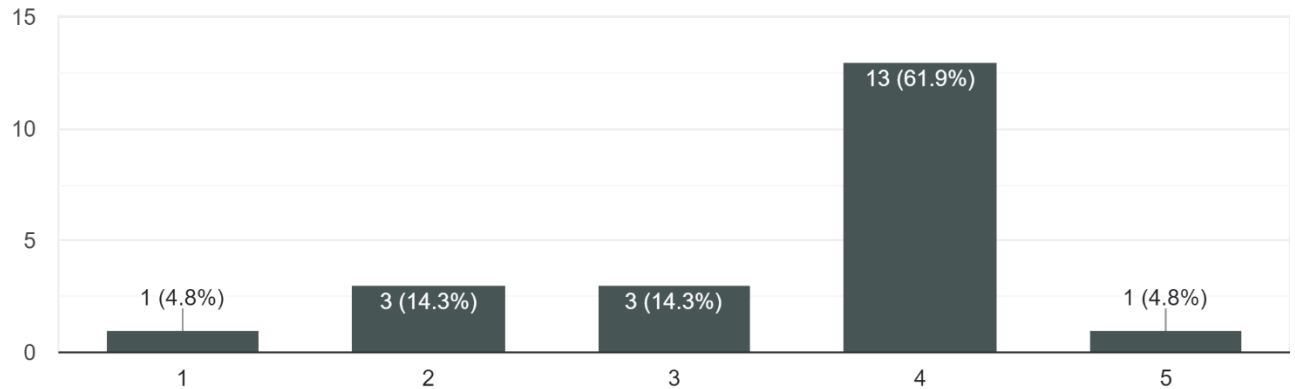


Figure 19 Question 10

The usefulness of automated vehicles was rated on a 4/5 scale, accounting for 61.9% of the total participants. This is a huge number in the survey. Most people find automated vehicles very useful.

What factors do you think would make an automated vehicle the most useful?

21 responses

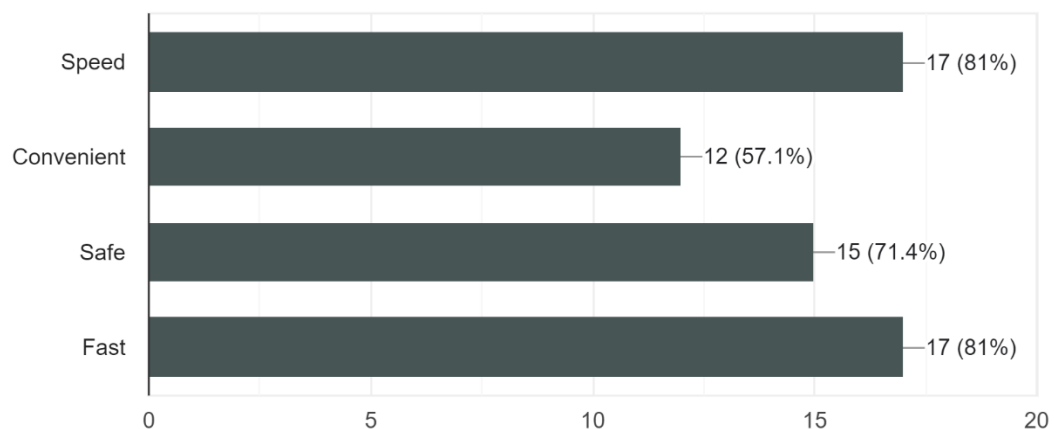


Figure 20 Question 11

The selection factors are all evaluated based on vehicle speed and safety. Most people rate the speed of participation at 81% and safety at 71.4%.

Do you expect that automated vehicles will become more common in life?

21 responses

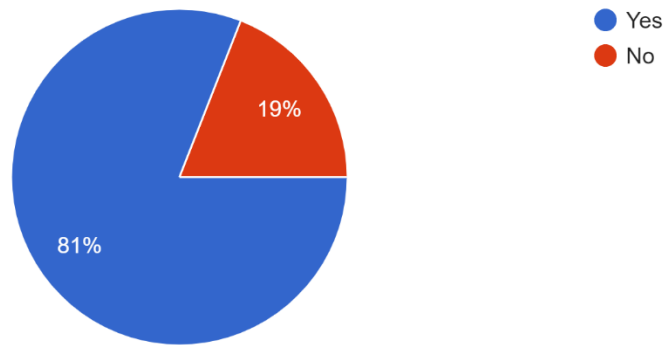


Figure 21 Question 12

Most people expect that automated vehicles will be applied and become common in life.

1.1.2. Interview

In order to be able to communicate correctly with the correct factor and without bias to the respondent, I will keep the main answer intact to ensure accuracy. I will assist with the English translation.

Question	Answers	Evaluate
1. How often do you drive?	“Yes, I drive every day” – Pham Hoang Minh “Sometimes when I go far away, I will drive, but usually not.” – Pham Duc My Student	<i>Most people give the answer, yes and they use transportation every day.</i>
2. What do you think if there is a vehicle that automatically moves and joins traffic?	“If so, that's a good thing for the community, which is what all technologies need to develop and implement these days.” Đao Viet Anh Tech Taxi Driver	<i>Everyone feels that the development that has it brings great benefits to society.</i>
3. Do you think it is safe for everyone?	“Most people think that automatic vehicles that enter traffic already sound unsafe, I will feel a bit scared if I sit in that car and move. Actually, I don't really believe it.” Pham Hoang Minh Taxi Driver	<i>For everyone, because this is a new technology product that has not been tested many times, they do feel not very confident in its safety.</i>
4. Does it matter if an automatic car enters traffic?	“For me, of course, there is a problem, for a taxi driver like me, using an automatic car makes me lose my job, of course, I wouldn't want that.” Nguyen Van Manh Student	<i>Everyone is excited when everything becomes automated, but taxi drivers feel their jobs are being shaken by upcoming technologies.</i>
5. Do you wish and think that this automatic car will improve the quality of life as well as more convenience?	“I also hope that autonomous vehicles will become more common, and I look forward to using them in the future.” Nguyen Quoc Huy Student	<i>Most people are looking forward to the results of automated vehicles being announced and put into use in life.</i>

2. Conclusion

After the above primary research, I also gave myself a basic assessment of the research process. Based on the above interview questions, I felt everyone's expectations in my research project this time. Besides, the survey also had clear research data for me. This will be one of the important data that help me complete the research in the most detailed and correct way.

IV. Discuss merits, limitations, and pitfalls of approach data collection and analysis

While collecting information to maximize the value of the data and accuracy of the data, I chose to send the survey link to the subjects that I selected.

I used primary research, secondary research, quantitative and qualitative analysis, as well as survey approaches, to gather the data for the research piece mentioned above. utilizing that method. I now understand the advantages, drawbacks, and dangers of various data collection and analysis techniques:

Quantitative approach: If the answer is affirmative, the data will be expressed numerically or quantified. It can make statistical manipulation and mathematical calculations much simpler for us.

Qualitative methods: Qualitative data is information that cannot be quantified or measured and cannot be expressed numerically. Instead, than using numbers or open-ended inquiries, it uses words, pictures, observations, and symbols. That aids in collecting diverse viewpoints for my research. However, it has a drawback in that the inquiries cannot be specific.

I used Google Forms to create survey questions and collect user information. It made it simple for me to gather data rapidly from a sizable population of people via an online survey. Second, compared to other ways, it is inexpensive.

But as I go, I can see some restrictions because the responses might not be truthful. It's possible that some people just participate in online surveys to claim the incentive. It's possible that many questions won't be resolved and that some participants won't show there. The data is quite likely to be leaked and is very simple to get while conducting and analyzing google forms.

Google Forms' analytics feature makes it simple for me to view and compare data in several charts and a table.

Primary research method: When conducting primary research, I have more control over the data that is gathered, and primary data is frequently updated because it is gathered in real-time rather than using data from earlier sources. Since the information is gathered through user reviews, its authenticity can be believed. However, it also has significant drawbacks, such as the lengthy and expensive implementation process.

Regarding the implementation of primary data, the researcher can access it on a variety of platforms. Typically, I spend less time collecting secondary data than I do gathering primary data. However, as the sources may not be genuine and authentic, it may not be. My research can be inaccurate if I fall victim to disinformation or outright lies when conducting primary research.

In conclusion, I encountered numerous restrictions and problems while conducting the research using various research methodologies and data analysis, but I overcame them and finished the research report.

V. Appendix

1. Proposal form

Student Name: Quach Cong Tuan

Student ID: BHAF200014

Tutor: Nguyen Thai Cuong

Date: 13/09/2022

Unit 13: Computing Research Project

Propose title:

Section One: Title, objective, responsibilities

Research Question:

The Future of Autonomous Vehicles In Artificial Intelligence And The Internet Of Things?

Objectives

I want to learn:

- What are artificial intelligence and the internet of things?
- What role do automated vehicles play in life?
- How will the use of automated vehicles support and benefit life?
- How to build and develop automated vehicles?
- Application of artificial intelligence in autonomous vehicles?
- Ways to analyze and manage data for automated vehicles in AI and IoT?
- The future of autonomous vehicles?
- Autonomous vehicle challenge in technology?
- Automated and efficient media solutions for the moment?
- Practical applications of automatic vehicles in life?

Section Two: Reasons for choosing this research project

Reasons for choosing the project:

Today, artificial intelligence and IoT are developing quite strongly and helping people to change their lives and develop their lives in a positive way. Realizing the importance of applying AI and IoT in life, I have made judgments and aimed to analyze the application of AI and IoT in life.

To choose a topic, I realized that participating in traffic in Vietnam is very complicated. Sometimes there are systems that need us to upgrade and improve. Further, the use of technology to apply to autonomous vehicles will be a new step in the technology industry.

In Vietnam, I realized that automated vehicles are not yet popular and active, but I see the potential of this application in the future, so I decided to analyze this project.

I believe that after my research, the application of automation in AI and IoT will be more popular and developed, helping users have better experiences in life.

Section Three: Literature source searched

The initial sources which could help me to answer those questions:

1. <https://www.embitel.com/blog/embedded-blog/the-2020-iot-trends-that-will-disrupt-industry-4-0>
2. https://www.softwareag.com/en_corporate/resources/what-is/machine-learning.html
3. <https://data-flair.training/blogs/iot-and-machine-learning/>
4. https://www.softwareag.com/en_corporate/resources/what-is/machine-learning.html
5. <https://vnexpress.net/khoa-hoc/cuoc-thi-sang-kien-khoa-hoc/y-tuong/ung-dung-tri-tue-nhan-tao-va-cong-nghe-iot-vao-du-doan-som-nguy-co-bo-hoc-cua-sinh-vien-1076579161>
6. <https://movan.vn/ung-dung-iot-tri-tue-nhan-tao-va-machine-learning-de-tao-ra-mot-toa-nha-thong-minh/>
7. <https://www.iotforall.com/artificial-intelligence-and-autonomous-vehicles>
8. <https://www.fullstory.com/blog/qualitative-vs-quantitative-data/#:~:text=Quantitative%20data%20is%20numbers%2Dbased,what%20happened%20behind%20certain%20behaviors>
9. <https://www.teldat.com/blog/autonomous-cars-with-embedded-connectivity-using-iot-ai-5g-roboethics/>
10. <https://impacx.io/blog/autonomous-cars/>
11. <https://www.analyticssteps.com/blogs/ai-iot-benefits-and-applications>
12. <https://www.techopedia.com/definition/33768/artificial-intelligence-of-things-aiot>
13. <https://www.clariontech.com/blog/ai-and-iot-blended-what-it-is-and-why-it-matters>

Section Four: Activities and timescales

1. **Choose Research Topic**
2. **Write Research Proposal Form**
3. **Complete Research Proposal Form Draft**
4. **Milestone 1 [6-12/9]:** Get Feedback from The Tutor About Research Proposal Form and Complete
5. **Project Planning**
6. **Literature Review**
7. **Check Project Progress:** Research Proposal, Plan, Literature Review
8. **Milestone 2 [20-26/9]:** Get Feedback on Literature Reviews from Tutor
9. **Milestone 3 [26/9-04/10]:** Make Up Qualitative and Quantitative
10. **Primary Research**
11. **Milestone 4 [4-10/10]:** Analyse Research Results and Data
12. **Milestone 5 [10-15/10]:** Get Feedback from Primary Research and Complete
13. **Conduct Secondary Research**
14. **Milestone 6 [15-22/10]:** Get Feedback from Secondary Research and Complete
15. **Write Assignment 1:** LO1 And LO2
16. **Milestone 7 [22/10]:** Review Assignment 1 Draft by Tutor
17. **Milestone 8 [8/11]:** Submit Assignment 1
18. **Write Assignment 2**
19. **Milestone 9 [13/12]:** Review Assignment 2 Draft by Tutor

Section Five: Research approach and methodologies

- Research process: Sequential
- Research classes: Quantitative and Qualitative
- Research method: Primary Research (Survey) and Secondary Research (References from FPT Software, etc.)

Comments and agreement from tutor

Comments (Optional):

I confirm that the project is not work which has been or will be submitted for another qualification and is appropriate.

Agreed: (Name).....(Date).....

Comments and agreement from project proposal checker (if applicable)

Comments (Optional):

Agreed: (Name).....(Date).....

2. Ethical form

Research Ethics Approval Form

Section One: Basic Details
Propose title: Conduct research on the application of IoT in transportation.
Student Name: Quach Cong Tuan
Student ID: BHAF200014
Program: Information Technology
School: British College BTEC – FPT
Intended research start date: 17/10/2022
Intended research end date: 17/12/2022
Section Two: Project Summary
<p>Please select all research methods that you plan to use as part of your project</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Interviews <input checked="" type="checkbox"/> Questionnaires <input type="checkbox"/> Observations <input type="checkbox"/> Use of personal records <input checked="" type="checkbox"/> Data analysis <input type="checkbox"/> Action research <input type="checkbox"/> Focus group <input checked="" type="checkbox"/> Others: Primary research, Secondary research, Qualitative research, Quantitative research, Survey.
Section Three: Participants
<p>Please answer the following questions, giving full details where necessary.</p> <p>Will your research involve human participants? Yes</p> <p>Who are the participants? Tick all that apply:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Children aged: 12 – 16 <input type="checkbox"/> Young people aged: 17 – 18 <input checked="" type="checkbox"/> Adult

Figure 22 Ethical form

How will participants be recruited (identified and approached)?

For survey questions I will send them via email or through social platforms like Facebook.

How will you obtain consent from participants? Will this be written?

How will it be made clear to participants that they may withdraw consent to participate at any time?

The participants were interested in my research, and I also gave the participants some small gifts.

Studies involving questionnaires:

Will participants be given the option of omitting questions they do not wish to answer?

☒ Yes

☐ No

If "No" please explain why below and ensure that you cover any ethical issues arising from this:

.....

.....

.....

Studies involving observation:

Confirm whether participants will be asked for their informed consent to be observed.

☒ Yes

☐ No

Will you debrief participants at the end of their participation ?

(i.e. give them a brief explanation of the study)

☒ Yes

☐ No

Will participants be given information about the findings of your study?

(This could be a brief summary of your findings in general.)

☐ Yes

☒ No

Figure 23 Ethical form

Section Four: Data storage and security

Confirm that all personal data will be stored and processed in compliance with the Data Protection Act.

☒ Yes

☐ No

Who will have access to the data and personal information?

No one can access it but me. Only I will be able to access all research data.

During the research

Where will the data be stored? My laptop, Google Drive

Will mobile devices (such as USB storage and laptops) be used?

☒ Yes

☐ No

If yes, please provide further details: Laptop

After the research

Where will the data be stored? My laptop, One Drive and Google Drive

How long will the data and records be kept for and in what format? My data is stored on storage forever on Google Drive

Will data be kept for use by other researchers?

☐ Yes

☒ No

Section Five: Ethical issues

Are there any particular features of your proposed work which may raise ethical concerns?

☐ Yes

☒ No

Figure 24 Ethical form

Section Six: Declaration	
<p><i>I have read, understood and will abide by Research Ethics Policy:</i></p> <p> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No </p> <p><i>I have discussed the ethical issues relating to my research with my unit tutor:</i></p> <p> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No </p>	
<p>I confirm that to the best of my knowledge:</p> <p><i>The above information is correct and that this is a full description of the ethics issues that may arise in the course of my research.</i></p> <p>Agreed: (Name)..... Quach Cong Tuan(Date)..... 01 / 11 / 2022</p>	

Figure 25 Ethical form

VI. Conclusion

In this part of the research, I have found that the research and development of AI and IoT in life will be a certainty in the future. The turning points of the technology industry are gradually being demonstrated and technology companies have also created and offered solutions to life's topics. The importance of AI - IoT will overcome many tasks in life.

For this part of my research, I saw the potential of automated means. For development and construction processes that help change the repetitive tasks of life. Just like public transport used in resort complexes, airports, Automated vehicles will always meet human needs, and this will happen soon.

VII. References

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