

Batch: A2

Roll No.: 1911027

Experiment / assignment / tutorial No. 1

Grade: AA / AB / BB / BC / CC / CD / DD

Signature of the Staff In-charge with date

Title: Study of Artificial Intelligent project.

Objective: To study various AI projects for their architectures. Complexity, programming language, applications and other AI related concepts.

Expected Outcome of Experiment:

Course Outcome	After successful completion of the course students should be able to
CO1	Understand the history & various application of AI and choose appropriate agent architecture to solve the given problem.

Books/ Journals/ Websites referred:

1. http://en.wikipedia.org/wiki/List_of_artificial_intelligence_projects
2. http://www.cs.cornell.edu/courses/cs478/2002sp/mlinks/interesting_ai_demos_and_project.htm
3. <http://homepages.inf.ed.ac.uk/rbf/AIMOVIES/AImovai.htm>
4. “Artificial Intelligence: a Modern Approach” by Russell and Norving, Pearson education Publications
5. “Artificial Intelligence” By Rich and knight, Tata McGraw Hill Publications

Pre Lab/ Prior Concepts:

History and evolution of AI, Artificial intelligence: definitions and theories.



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Historical Profile:

AI research is highly technical and specialised and is also divided by several multidisciplinary technical issues. So far there are many projects those have been developed and are in progress to work on those issues. Students must learn the applications of intelligent robots by studying various such projects to know the depth and complexity of the course.

New Concepts to be learned:

Applications of AI, Current research and future research potential in the field.

Chosen Project Name:

Hopper:- AI for travel and transportation.

Project Description:

Using AI, Hopper predicts flight and hotel prices and offers its users personalized recommendations about the optimal booking time, as well as alternative travel offers. It is a mobile-only flight and hotel booking application co-founded by a former Expedia executive Fred Lalonde. Hopper has established a distinctive position by making recommendations for when consumers should make travel purchases and helping customers discover new trips outside of their search criteria. As an AI-driven and data-driven company, Hopper hopes to take advantage of proprietary algorithms and data that it has collected to increase engagement with customers and predict customer intent. Today, it is the only application available in the world that provides accuracy at such scale and guides people to 'book at exactly the right time' and saves. Leveraging AI, the application aims to predict price what a user is looking for not the airlines have to sell. It makes the app different from other online shopping sites. Hopper crunches data to understand flight shopping patterns such as user's search patterns, preferred location, and so much and suggest when the best flight prices are available.

Demand forecasting: One of the key features that Hopper currently offers is to make predictions about future flight prices. The company also makes recommendations about whether users tracking a flight should “buy now” or “wait for a better price”. To do so, the company has created the largest flight database in the world. This includes trillions of historic prices from the past decade, as well as an active feed of about 300 billion prices a month. Hopper has built up a data feed about the volume of demand across



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travel agencies, OTAs, and metasearch sites to examine what people are searching for and asking for. This creates a leading indicator that helps Hopper forecast how airlines will adjust their rates. Rather than just creating a matrix of prices between different travel locations, the combination of historical data, demand data, and other measures creates a powerful prediction engine. This has allowed the company to predict airfare prices with 95% accuracy up to one year in advance.

User intent prediction: Rather than passing the customer to another site, the booking takes place right in the app. This enables Hopper to 1) regularly engage with users about travel opportunities and 2) gather end-to-end user data. Rather than a customer visiting a travel website with a specific travel date and location in mind, users come back to the app on average every four to five days. Hopper customers will frequently revisit the application to get the best travel deals and get inspiration for other travel. Furthermore, the trips that are planned on Hopper serve as proprietary data that helps the company predict what people will buy even though they have not asked for it. Hopper learns more about its users by building lookalike profiles of anonymized data of people who have similar preferences to you.

Future strategies: Hopper provides price forecasting and making predictions about user intent. While it has focused on airline travel, they may be well-positioned to expand into other types of travel and lodging. For example, a user's air travel query is highly correlated with the type of lodging they will purchase. The company will need to make additional investments to learn customer preferences and provide personalized recommendations about additional services or upgrades.

Project development:

1) Ultimate features development: Hopper guides its users for a better outcome. Initially, you should focus on developing a mobile-only application with all the ultimate features. Once you decide all prominent features and the list is clear in your mind, you should begin the development.

2) Custom database development: With the help of your mobile application, you can also collect data slowly and steadily in some years. Here you must understand custom database development is a continues process. It also requires continues funding and a dedicated development team for your project. It's an on-going process where maintenance, support, and management also have a crucial role in delivering excellent results.

3) AI integration: AI is the core component in Hopper. We believe upwards of 75% of all planning in travel is probably going to end up being algorithmic, meaning you will express some vague or specific intent and the algorithms will guide you to a better outcome. You can put AI layers upon layers on your powerful and performant database. It enables predictive models, computer vision and natural language understanding. AI



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understand context with significant accuracy. It predicts outcomes and improves as more data is available. Like custom data, integrating AI and its development will also be a continues process.

Cost estimation: Cost of professional application development services depends on a number of factors. Right from the platform you choose like Android or iOS or both to the level of UI, Tech stack requirement to payment integration, features requirements to API integration, analytics, and security and the level of the project's complexity, each and everything needs to be considered to decide how much it will take to build an app.

Project category/field (Game, NLP etc):
Machine learning, Price prediction, Travelling

Agent architecture: (State just name): Utility based agent

Programming language in which the project is/was developed:

Website:

1. PHP 2. LISP 3. Wolfram 4. Data lake

App:

1. Java 2. LISP 4. Data lake

Awards won by the project:

- 1. Hopper wins National Global Entrepreneurship Award of the Year by Startup Canada**
- 2. Hopper Wins the Webby Award for Best Travel App!**
- 3. Hopper Wins Standout Startup at the Inaugural Google Play Awards**
- 4. Award for one of the Best Midsize Companies to Work for in Boston**

Nature of the project (Experimental/in use in real world):

Hopper has carved out a distinct place for itself by building an AI framework that not only helps people find good deals, but also discover trips they may have not known that they specifically wanted to take. AI is used to build profiles of users and their interests, which Hopper starts to build after someone downloads the app and opens it for the first time and starts to use it. From that, Hopper asks to send push notifications, and when users respond to those, this helps shape their profiles further. Added to this are some classic AI methods: learns more about its users by building lookalike profiles of anonymised data of people who have similar preferences to you. "It's similar to how



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Netflix will recommend a show to you based on what other viewers like you are watching,” he said. “What once was done by a human travel agent is now done through a machine that gets smarter each time an action is (or is not) taken.” Fundamentally, the idea behind Hopper is that we should not be doing all of this work and heavy lifting ourselves—that there’s a better way. On average, we spend three weeks planning per trip and we look at 20 to 25 websites. We built Hopper on the idea that it was amazing in the early days of online travel, when you finally were able to do it yourself. The idea is that when you use Hopper, you’re saving anywhere between 15 and 40 per cent on airfare and for hotels, about a third of what we sell is straight-up 20 per cent cheaper than anywhere on the web. Having something that understands you, having these amazing outcomes in terms of price savings—but also discovering things that you never thought you would buy—that’s where all of commerce will be, not just travel. That’s the future of commerce. So consider you are planning a trip for world tour. So for this you will almost go through tons of websites to find the good deals and you will ended up with finalising some. But the problem with this approach is that your time and energy will be invested in a huge amount. In this technological era we must not waste time when we have all the resources available. So hopper will help you do all the things. So whenever you want to go for a trip you can just use hopper and that’s it now hopper will handle everything related to your travels.

All the things the hopper can do for you:

1. Suggests about what the trips you can go for based on your interest.
2. Give the best deals for tickets and hotel bookings.
3. From hopper, bookings can be done from app/website itself instead of going to another website for bookings.
4. Hopper can also suggest at what time you should travel so that you will get best deals on your tickets as well as on your hotel bookings.

Applications of the project:

1. The Hooper project idea is used by many big transportation companies to give good and cheaper services to their customers.
2. This project is used in making applications of stock recommendations for investors.
3. Government is using this app to understand what the citizens of the country want from public transports.
4. This idea is used by countries to increase their import export.




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Chat session with any chatbot(questions should vary difficulty level):


Chatbot link: <https://chat.kuki.ai/chat>

What is an operating system?

 It's the software that controls the execution of computer programs. I can run on any OS.


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What is FORTRAN?

 It is an old computer language.

Send

What is stack data structure?

 In computer science, a stack is an abstract data type that serves as a collection of elements, with two main principal operations: Push, which adds an element to the collection, and Pop, which removes the most recently added element that was not yet removed. The order in which elements come off a stack gives rise to its alternative name, LIFO (last in, first out). Additionally, a peek operation may give access to the top without modifying the stack.

Send

Post Lab Descriptive Questions:

1. is called the father of AI.

- A) James C Gosling
- B) Dennis Ritchie
- C) Alan Turing
- D) Isaac Newton

Answer: C) Alan Turing

2. In AI is a combination of data structures and interpretive procedures.

- A) Knowledge
- B) Meta-knowledge
- C) Artificial Knowledge



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D) Performance

Answer: A) Knowledge

Post Lab Descriptive Questions:

1. Define Artificial Intelligence in terms of human performance.

ANS) Artificial intelligence (AI) gives machines the ability to learn from experience as they take in more data and perform tasks like humans. Computers with these advanced technologies are trained to complete human-like tasks by processing data and recognizing the patterns within it. Artificial Intelligence (AI) is the branch of computer sciences that emphasizes the development of intelligence machines, thinking and working like humans. While Human Intelligence aims to adapt to new environments by utilizing a combination of different cognitive processes, Artificial Intelligence aims to build machines that can mimic human behaviour and perform human-like actions. The human brain is analogous, but machines are digital. Humans use the brain's computing power, memory, and ability to think, whereas AI-powered machines rely on data and specific instructions fed into the system. Human Intelligence is all about learning from various incidents and past experiences. Artificial Intelligence falls behind in this respect – machines cannot think. They can learn from data and through continuous training, but they can never achieve the thought process unique to humans. While AI-powered systems can perform specific tasks quite well, it can take years for them to learn a completely different set of functions for a new application area.

2. What is a Turing test?

ANS) Turing test is used to determine whether or not a computer(machine) can think intelligently like humans. Alan Turing proposed a simple method of determining whether a machine can demonstrate human intelligence. If a machine engages in a conversation with a human how to process the data it has been demonstrated by a machine, He has proposed the following skills of the test as follows: The turning judges the conversational skills of humans. According to this test, a computer program can think a proper response for humans. This test matching the conversational data from the existing data through an algorithm and back respond to humans. The test is conducted in an interrogation room run by a judge. The test subjects, a person and a computer program, are hidden from view. The judge has a conversation with both parties and attempts to identify which is the human and which is the computer, based on the quality of their conversation. Turing concludes that if the judge can't tell the difference, the computer has succeeded in demonstrating human intelligence. That is, it can think.

3. Define an Omniscient agent. Are the intelligent agents Omniscient?

ANS) An agent can be viewed as anything that perceives its environment through sensors and acts upon that environment through actuators. An omniscient agent is an



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agent which knows the actual outcome of its action in advance. However, such agents are impossible in the real world. An intelligent agent is an autonomous entity which act upon an environment using sensors and actuators for achieving goals. An intelligent agent may learn from the environment to achieve their goals. A thermostat is an example of an intelligent agent. Generally the intelligent agents are not omniscient.

4. What can today's AI systems do?

ANS) Today's AI systems can do the following:

- 1. Speak** – Artificial intelligence can also speak. While it's helpful (and fun) to have Alexa and Google Maps respond to your queries and give you directions, Google Duplex takes it one step further and uses AI to schedule appointments and complete tasks over the phone in very conversational language.
- 2. Read** – Whether it's news articles, weblinks, books, emails, legal documents, audio and image files, and more, automatic text summarization by artificial intelligence and machine learning reads communication and reports back the essential information.
- 3. Touch** – Using sensors and cameras, there's a robot that can identify "supermarket ripe" raspberries and even pick them and place them into a basket! Its creator says that it will eventually be able to pick one raspberry every 10 seconds for 20 hours a day!
- 4. Move** – Artificial intelligence propels all kinds of movement from autonomous vehicles to drones to robots. The Alter 3 production at Tokyo's New National Theatre features robots that can generate motion autonomously.
- 5. Understand emotions** – Market research is being aided by AI tools that track a person's emotions as they watch videos. Artificial emotional intelligence can gather data from a person's facial expressions, body language, and more, analyze it against an emotion database to determine what emotion is likely being expressed, and then determine an action based on that info.
- 6. Create** – Artificial intelligence can even master creative processes, including making visual art, writing poetry, composing music, and taking photographs. Google's AI was even able to create its own AI "child"—that outperformed human-made counterparts.
- 7. Write** – AI is able to expand beyond this to more creative writing as well. Many marketers are turning to artificial intelligence to craft their social media posts. Even a novel has even been generated by artificial intelligence that was short-listed for an award.

5. What can today's AI systems cannot do?

ANS) Today's AI systems cannot do:

- 1. AI cannot possess high emotional intelligence** – AIs today are far from being emotionally intelligent. They cannot yet comprehend emotions; lacking the capacity to be truly aware of theirs or people's emotion. Though huge breakthrough has been achieved in AI with respect to emotional intelligence. AI systems can mechanically



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interpret our emotions without necessarily having their own emotions. But that does not translate to true emotional intelligence.

2. AI cannot solve everything – There is a popular philosophy in the AI community, ‘given enough data AI can solve all of humanity’s problem’. This philosophy has led most people into thinking that AI can solve everything. Well, current AI cannot solve everything and may never be able to solve just about any problem.

3. AI cannot communicate with Understanding – Indeed, we’ve had smart speakers/assistants like Alexa, Google Home, Apple Home and Galaxy Home that can speak with you, yet, they have no understanding of what they say. AIs can communicate but not with understanding and one can argue that they cannot truly communicate since they have no understanding. Though we’ve seen social robots like Sophia attend interviews and talk shows, and they seem to be communicating with understanding but that’s not entirely so.

4. AI cannot bring inventions – AI can follow rules; it cannot create from scratch like humans. Humans can invent scientific tools, compose songs, and mathematical theorems. These innovations are genuine, unlike any product produced by AI. AI uses past observations to learn a general model or a pattern, that can be used to make predictions about future similar occurrences. AI cannot think out of the box like humans.

5. Write Bug-Free Software – Another area that is difficult for Artificial Intelligences is finding bugs in software. Don’t get me wrong, artificial intelligence may be a big help in looking for patterns that might suggest there is a bug but a little-known theory by Gordon Rice extends Turing’s original proof to show computer programs can’t know anything interesting about another computer program.

6. Predict the Future of our Universe – There’s a growing view in the scientific community that our Universe might be a computer and we live in a simulation. We shoot probes out into space and simple equations predict their path. Perhaps this is because the Universe is an enormous computer and uses these same equations. But we can test this using the Bell experiment. When we test our Universe to see if it follows a pre-defined set of rules we find it doesn’t. The particles in our Universe don’t know what they will do in advance - there are no hidden variables controlling them - they behave randomly. Computers follow a strict program with no randomness allowed so an AI can’t model our Universe and predict its future.

6. Design ten questions to pose to a man or a machine that is taking a Turing test.

ANS) Questions: 1. Where do you see yourself after 10 years?

2. What is your worst memory of childhood?

3. Would you sacrifice your job for higher studies?

4. Who is more intelligent you or me?

5. If someone tells you to shoot yourself will you do that?

6. What is the definition of god?



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7. If a person is under water, should anyone give him umbrella?
8. A car stopped on a road and the car driver is watching tyre, what is he doing?
9. Which moment in your life is most important to you?
10. If you die will you donate your organs that are working by signing an agreement after you die, is it funny?