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DECLARATION

We hereby declare that this project report entitled “ASSISTERE” is written by us and is our own effort and that no part has been copied or taken without a mentioning reference of source.

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This project document is submitted to the Department of Computer Science at National Textile University in partial fulfilment of the requirements for the degree of Bachelor of Science in Information Technology. The Project is equivalent to 32 weeks of full- time studies. We have read the report and confirm that this report meets the minimum requirements for the degree of Bachelor of Science in Computer Science (BSCS).

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CERTIFICATION

This is to certify that this project titled “ASSISTERE” was found to satisfy the requirement for the award of “Bachelor of Sciences Computer Science” degree by the Department of Computer Science, National Textile University.

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FYP-Convener **Date**

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Head of Dep Date

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Contents

Chapter 1

Introduction to AI

Artificial Intelligence is the process of making a computer, a robot, or a product to imagine how intelligent a person can be. AI is the study of how the human brain thinks, learns, determines and functions, while trying to solve problems. And finally this research produces intelligent software programs.The purpose of AI is to improve computer functions related to human knowledge, for example, thinking, learning, and problem solving. Wisdom is unstoppable. It was built

- Consultation
- Reading
- Problem solving
- Seeing
- Linguistic Intelligence

The objectives of AI research are thinking, knowledge representation, planning, learning, natural language processing, achievement, and the ability to move and deceive things. There are long-term goals in the field of general intelligence.

The short answer to What is Artificial Intelligence depends on who you ask.

The average person with advanced technological know-how can connect you to robots. They may say that Artificial Intelligence is a mathematical formula that can perform and think for itself.

If you inquire about artificial intelligence in an AI researcher, (s) may say that a set of algorithms can produce results without being explicitly instructed to do so. And they'll all be fine. So in summary, the definition of Artificial Intelligence is:

What is Artificial Intelligence?

- An intelligent entity created by humans.
- Capable of performing tasks intelligently without being explicitly instructed.
- Capable of thinking and acting rationally and humanely. How do we measure if Artificial Intelligence is personal?

Even if we get to the point where AI can behave like a human being, how can we be sure that it can continue to behave that way? We can support the personalities of an AI business with the following:

- Turing Test
- How to Model Ideas
- The Law of Thought
- Reasonable Agent Method

What is the Turing Test in Artificial Intelligence?

The basis of the Turing Test is that the Artificial Intelligence business should be able to hold a conversation with a person. A human agent should not be able to conclude that he or she is talking to Artificial Intelligence. To achieve these goals, AI needs to have the following characteristics:

Indigenous Language Processing is effective communication.

Representative Information to serve as its memory.

Automatic Consultation to use archived information to answer questions and reach new conclusions.

Machine learning to find patterns and adapt to new situations.

How to Model Ideas

As the name suggests, this approach attempts to create an Artificial Intelligence model based on Human Cognition. To clear the human mind, there are 3 ways:

Self-assessment: looking at our thoughts, and building a model based on that Psychological Experiments: conducting experiments on people and observing their behavior

Brain Imaging: Using MRI to see how the brain works in different situations and repeating that by code.

Rules of Thinking

The Rules of Thought are a large list of logical statements that govern the operation of our minds. The same rules can be incorporated and applied to artificial intelligence algorithms. Problems in this way, because problem solving in principle (precisely in terms of thought rules) and solving them in practice can be very different, requires the use of nuances of context. Also, there are some actions we do without 100% certainty of the result the algorithm may not be able to duplicate itself if there are too many parameters.

The Rational Agent Approach

The sensible agent makes gaining the best possible result in its current conditions. In accordance with the rules of reasoning, the business must conduct itself in accordance with sound statements. But there are certain situations, where there is no logical thing to do, with many consequences involving different outcomes and corresponding consensus. The logical

agent approach seeks to make the best choice in the current situation. It means a very powerful and flexible agent.

Now that we understand how Artificial Intelligence can be designed to work as a human being, let's take a look at how these systems are built.

How Artificial Intelligence (AI) Works?

Building an AI system is a careful process of reverse-engineering human traits and capabilities in a machine, and using its computational prowess to surpass what we are capable of. To understand how Artificial Intelligence really works, one needs to delve deeper into the various sub-domains of Artificial Intelligence and understand how those domains can be applied to different areas of the industry. You can also take practical intelligence courses that will help you gain a complete understanding.

- **Machine Learning** : ML teaches a machine how to make inferences and decisions based on past experience. It identifies patterns, analyses past data to infer the meaning of these data points to reach a possible conclusion without having to involve human experience. This automation to reach conclusions by evaluating data, saves a human time for businesses and helps them make a better decision.
- **Deep Learning** : Deep Learning is an ML technique. It teaches a machine to process inputs through layers in order to classify, infer and predict the outcome.
- **Neural Networks** : Neural Networks work on the similar principles as of Human Neural cells. They are a series of algorithms that captures the relationship between various underlying variables and processes the data as a human brain does.
- **Natural Language Processing**: NLP is a science of reading, understanding, interpreting a language by a machine. Once a machine understands what the user intends to communicate, it responds accordingly.
- **Computer Vision** : Computer vision algorithms tries to understand an image by breaking down an image and studying different parts of the objects. This helps the machine classify and learn from a set of images, to make a better output decision based on previous observations.

Chapter 2

What are the Types of Artificial Intelligence?

Not all types of AI all the above fields simultaneously. Different Artificial Intelligence entities are built for different purposes, and that's how they vary. AI can be classified based on Type 1 and Type 2 (Based on functionalities). Here's a brief introduction the first type.

3 Types of Artificial Intelligence

- Artificial Narrow Intelligence (ANI)
- Artificial General Intelligence (AGI)
- Artificial Super Intelligence (ASI)

What is Artificial Narrow Intelligence (ANI)

This is the most common type of AI you can find on the market right now. These Artificial Intelligence programs are designed to solve a single problem and will be able to do one job very well. By definition, they have less power, such as recommending an e-commerce user product or weather forecast. This is the only type of Artificial Intelligence available today. They are able to approach human performance in very specific situations, and even surpass them many times, but only emerge in highly controlled areas with a limited set of parameters.

What is Artificial General Intelligence (AGI)

AGI is still a theoretical concept. It is described as AI with a human level of cognitive function, in all different fields such as language processing, image processing, computer performance and thinking and so on.

We are still a long way from building the AGI system. The AGI program will need to integrate thousands of Artificial Narrow Intelligence programs that work together, interacting with each other to mimic human thinking. Even the most advanced computer programs and infrastructure, such as Fujitsu's K or Watson of IBM, took 40 minutes to mimic one second of sensory activity. This speaks to both the great complexity and connection of the human brain, as well as the magnitude of the challenge of building an AGI with our current resources.

What is Artificial Super Intelligence (ASI)

We are about to enter the realm of science fiction here, but ASI seems to be a logical continuation from the AGI. The Artificial Super Intelligence (ASI) system will be able to surpass all human capabilities. This will involve making decisions, making sound decisions, and it includes things like making better art and building emotional relationships.

Once we have achieved Artificial General Intelligence, AI systems will soon be able to develop their skills and develop into areas that we may not have dreamed of. While the gap between AGI and ASI will be very small (some say it is as small as a nanosecond, because that is how Artificial Intelligence can learn) the long journey ahead of us to AGI itself makes this seem like a future idea.

Difference between Augmentation and AI

Artificial Intelligence	Augmented Intelligence
AI replaces humans and operates with high accuracy.	Augmentation does not replace people but creates systems that help in manufacturing.
Replaces human decision making	Augments human decision making
Robots/Industrial IoT: Robots will replace all humans on the factory floor.	Robots/Industrial IoT: Collaborative robots work along with humans to handle tasks that are hard and repetitive.
Real-Time Applications of AI in Customer Success 1. Automated Customer Support and Chatbots 2. Virtual Assistants Automated Workflows	Real-Time Applications of IA in Customer Success 1. IA-enabled customer analytics 2. Discover high risk/high potential customers 3. Forecasts Sales

Strong and Weak Artificial Intelligence

Extensive research in Artificial Intelligence also divides it into two more categories, namely Strong Artificial Intelligence and Weak Artificial Intelligence. The terms were coined by John Searle in order to differentiate the performance levels in different kinds of AI machines. Here are some of the core differences between them.

Weak AI	**Strong AI**
It is a narrow application with a limited scope.	It is a wider application with a more vast scope.
This application is good at specific tasks.	This application has an incredible human-level intelligence.
It uses supervised and unsupervised learning to process data.	It uses clustering and association to process data.
Example: Siri, Alexa.	Example: Advanced Robotics

What is the Purpose of Artificial Intelligence

The purpose of Artificial Intelligence is to hone human skills and help us make advanced decisions that have far-reaching consequences. That is the answer from a technical point of view. From a philosophical point of view, Artificial Intelligence has the potential to help people live meaningful lives without having to work hard, and to help manage a complex web of connected people, companies, provinces, and nations to work for the benefit of all mankind.

In the meantime, the goal of Artificial Intelligence is shared by all the different tools and strategies we have developed over the last thousand years - to simplify human effort, and to help us make better decisions. Artificial Intelligence is also called Final

> Invention, a creation that can create tools and services that can dramatically change the way we live, by eliminating conflict, inequality and human suffering with hope.

All of that is in the distant future though - we are still very far from those kinds of consequences. Currently, Artificial Intelligence is widely used by companies to improve the efficiency of their processes, perform heavy automation tasks, and create business predictions based on data that is stronger than gut feeling. Like all previous technologies, the cost of research and development needs to be funded by companies and government institutions before they can be accessed by ordinary people on a daily basis. To learn more about the purpose of artificial intelligence and where it is used, you can take an AI course and understand the details of the artificial intelligence study and high skill today.

Chapter 3

The Benefits of 3D Construction

Just why is 3D printing gaining so much buzz in the construction sector? As the industry faces increasing pressure to meet tight schedules and budgets, companies are looking to new innovations to help fill the gaps. 3D printing in construction offers a significant potential to increase efficiency in the building sector, including the following ways.

Speed

3D printing has already been shown that it can build a home or building from the ground up in a few days. That is much faster than conventional construction, which can take months and years to build a fully commercial building. According to Marco Vons, Marketing Manager at Saint-Gobain Weber Betamax, "Save about 60% of your work time and 80% at work."

Waste reduction

Worldwide construction waste currently totals more than 1 billion tons each year, and according to Construction Dive, this number is expected to double by 2025. While 3D printing won't be able to solve all of the construction waste problems, it can help. This is largely because 3D printing is an additive manufacturing process that only uses as much material as is necessary for creating a structure. When paired with other waste-reducing processes and building methods like prefabrication and lean construction, the potential of a waste-zero building seems all the more likely.

Design freedom

One of the great things about 3D printing is the design freedom that it offers. Architects are able to build complex designs that are otherwise unattainable, or too expensive or labor-intensive to create by conventional construction means. This can allow for a lot more innovation and creativity in the commercial construction space. Vonk adds, "3D concrete printing enables you to make any shape. You can bend it, you can make angles, you can make virtually any organic shape you want to, and it's a one-to-one copy to what you designed on paper."

Reduce human error

According to OSHA, more than 5,000 workers are killed on the job each day. Because construction would be more programmable and automated, worker injuries and fatalities would likely decrease if 3D printing was incorporated onto the jobsite.

The Challenges of 3D in Construction

Despite the benefits and potential that 3D printing has in the construction sector, there are a number of factors that may prohibit the technology from becoming mainstream. Below, let's explore a few of these challenges.

High costs

Perhaps the biggest challenge to the widespread adoption of 3D printing technology on construction sites is the high cost of purchasing or renting such equipment and the logistics involved in getting these large 3D printers to the work site. 3D printers are costly, and that upfront purchase cost doesn't include materials or maintenance. Right now, it's difficult for many construction professionals to justify 3D printing's cost over the technology's benefits.

Labor shortage

The construction sector is booming and skilled workers are in high demand. The only problem is that there are not enough of them.

Even considering the labor shortage, 3D printing requires an even more specific skill set that would have to pull from a slimmer and more niche group of candidates. Construction labor shortages are already a problem, and finding qualified workers to employ in 3D printing construction environments could prove to be even more challenging in the future.

Quality control

Weather already has the potential to slow construction progress, but issues with Mother Nature may be amplified with 3D printing. The weather, environmental factors and more are all conditions that could make 3D printing in commercial construction more of a bust than a boom. Furthermore, quality control in construction can already be a tricky matter. If not constantly monitored and overseen by real humans, quality in 3D printing could end up being a very expensive mess.

Regulations

One drawback that might not immediately come to mind is the regulation of 3D printing. While regulation in 3D printing has made the news cycle recently, it still hasn't fully impacted the construction industry. However, there's also the liability that may come with using printers rather than humans to perform certain construction tasks. Currently, there's much uncertainty in this aspect of 3D printing in construction. Until laws and regulations are clearly defined, it's unlikely that 3D printing will make too much of a mark in the construction sector.

A Hopeful Future Remains for 3D in Construction

Does 3D printing in construction have real staying power? From what we've seen, the promise is strong, just as long as companies like BAM and Saint-Gobain continue to innovate and push boundaries.

Overall, the potential of 3D printing is too great to ignore. While the industry may never reach a point where it's used exclusively, it's only a matter of time that the technology will be improved and advance significantly. Overall, 3D printing is poised to be a viable solution that offers key benefits in cost savings and environmental friendliness for our building's future.

Chapter 4

Lower Construction Cost: 3D printed houses have the potential to reduce the cost of materials and labor dramatically. Apis Cor is a company specialized in developing mobile 3D construction printers. To demonstrate the potential of the printers Apis Cor built a 410 square-foot house within the budget of around $10,000 with a cost break down for each component as shown in the below image.

Home Insurance: This study by Gavop on lowering home insurance costs mechanisms shows that choosing lower risk construction material lowers homeowner costs. Most home insurance premiums are based on replacement values and if the cost to build a house is cheaper to begin within than it follows that home insurance costs would also be dramatically lower.

Speed: A traditionally constructed house usually needs 6-7 months for construction. This is in contrast to the speed of a 3D Printed home. For example, a Chinese company Winsun used 10 meters wide and 6.6 meters tall printers to build 10 full-sized houses in the span of just 24 hours.

Strength and Durability: The advancement in 3D printing technology has seen the design of concrete-based houses in recent years, to withstand extreme weather conditions. A company called Tengda Hua Shang has claimed that their two-story, 400-square-meter house will even be able to survive an 8.0 magnitude earthquake on the Richter scale.

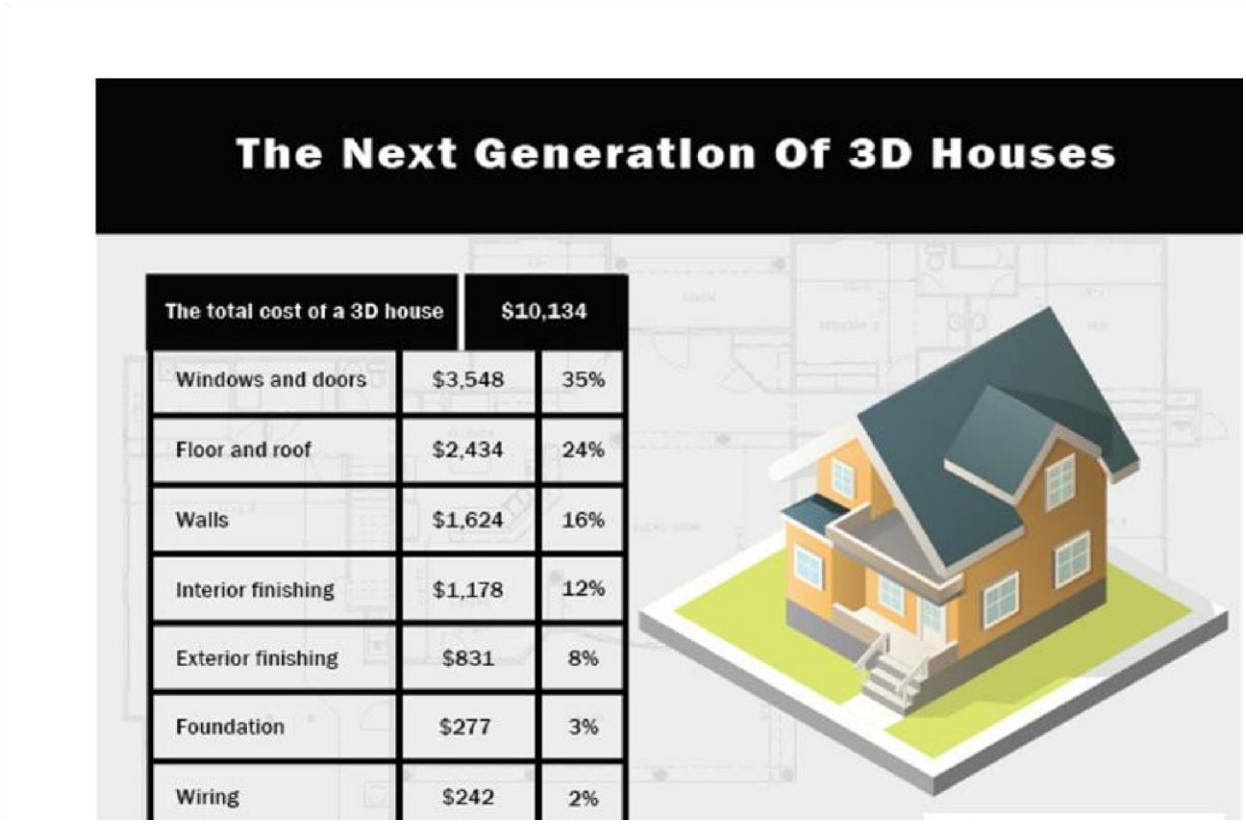
New Shapes and Designs: 3D printing technology provides homeowners with the flexibility of designing as per their taste. This new technology uses curvilinear structures rather than the usual rectilinear ones which adds a robust structural integrity to building architectures.

Carbon Footprint: Even in the sphere of sustainable energy, 3D printing technology does not lag behind. Amsterdam based architecture company DUS have recently completed printing a canal house using bio plastics produced from 80% vegetable oil.

The Dubai Future Foundation office that was 3D printed off-site by **Wensum** cost $140,000 at the time for the entire structure. With the fit and finish of this luxury office, a hundred and forty thousand dollars is quite a bargain seeing as how by using construction 3D printing technology, the government estimates that it saved almost 50% on the total (assembly, electrical, and technical) labor costs.
All three of the above are examples of luxury or large-sized 3D printed houses that cost a sizably less amount than what an equivalent construction done via conventional methods would cost.

On the other end of the scale are the small size houses that have been making headlines and have successfully been 3D printed at a fraction of conventional costs.
COBOD's construction 3D printing services provide an online project cost calculator based on various factors such as the square meter area of all the walls, labor cost and number of operators, and the cost per unit of 3D printing concrete.
The **cost of construction** comes out to be around **$15,000 for a small** sized house (single bedroom). **$20,000-25,000 for a medium** sized house (two bedroom). And around **$50,000 for a large** sized 4 bedrooms house.

Compare this with the fact that building one's own house can cost anywhere between $95 to $150 per square foot and it quickly becomes clear that even construction 3D printing services have a lot to offer in terms of cost savings.



Chapter 5

1.Use case Diagram

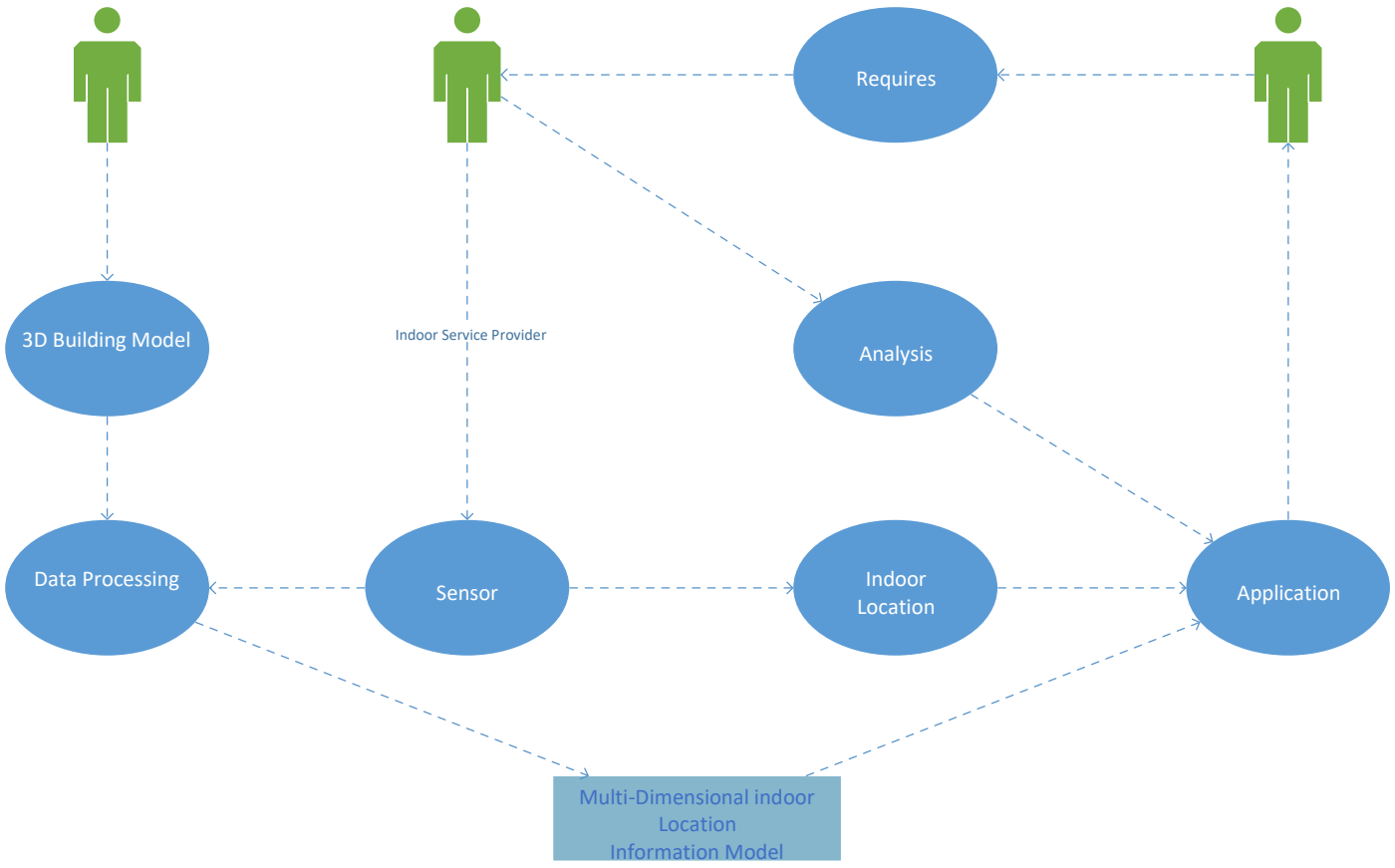
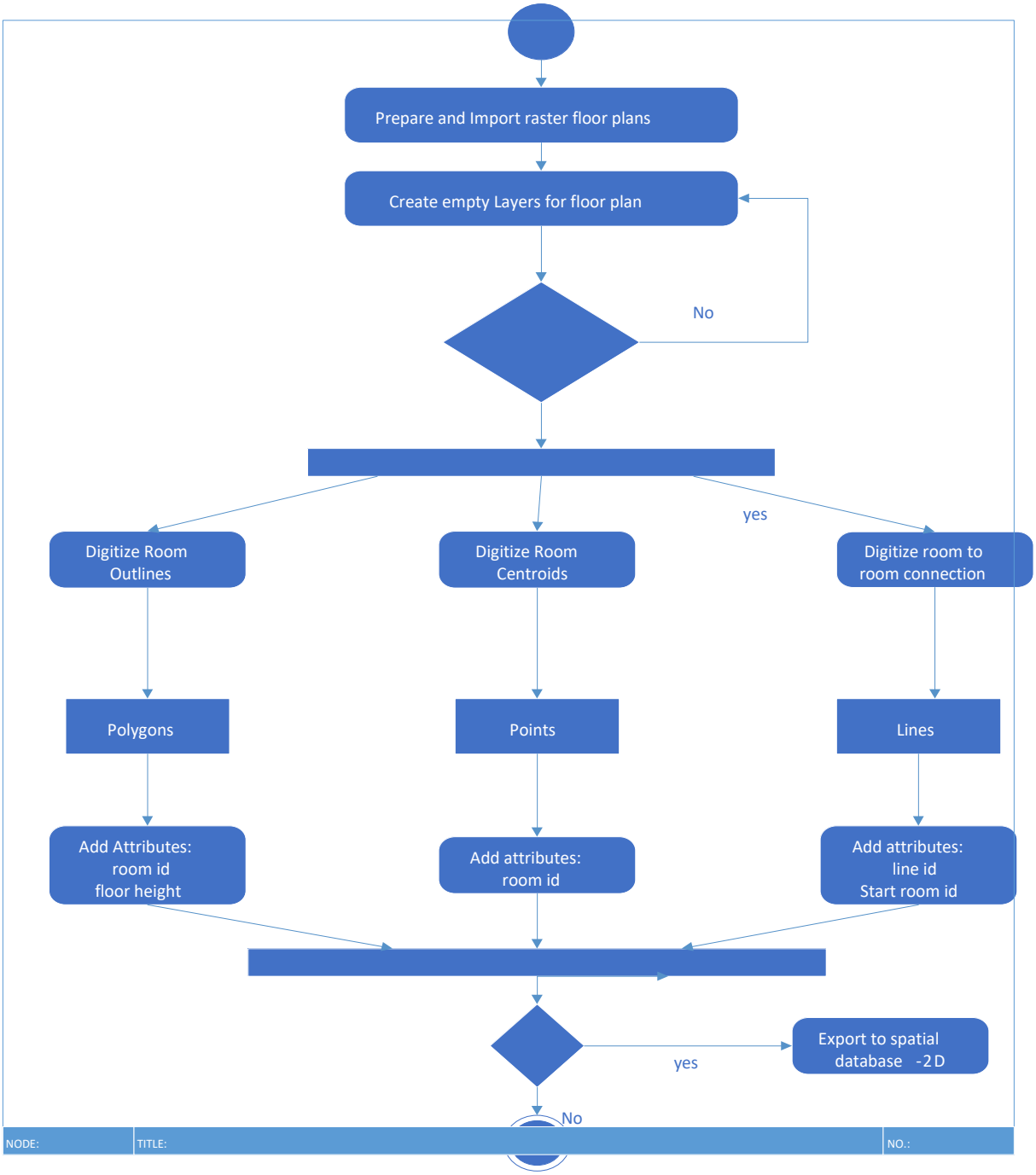


Fig 1.2: Use Case Diagram

UML activity diagram



Sequence Diagram of the application

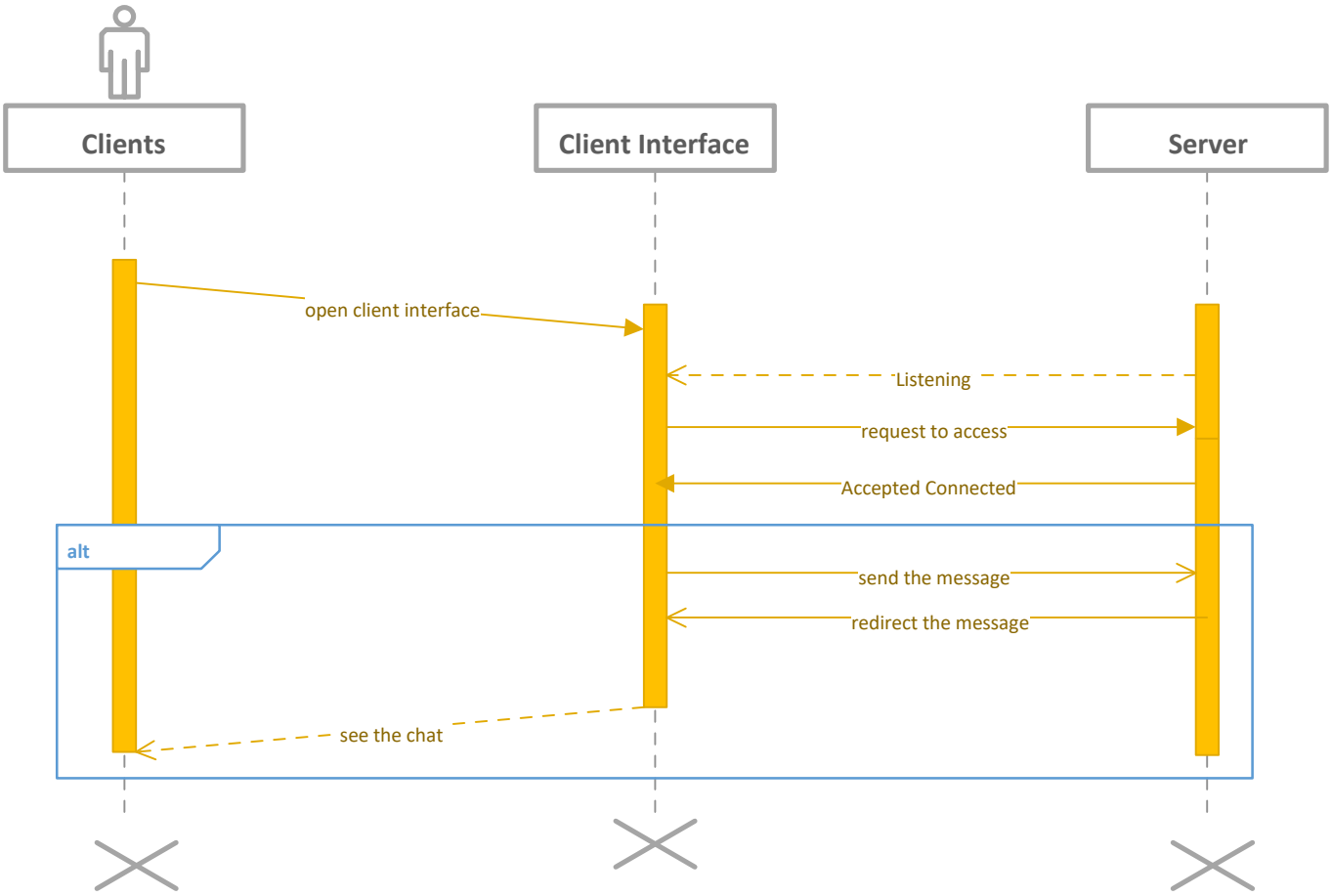


Fig 1.3: UML activity diagram Fig 1.4: Sequence Diagram of the application

Class Diagram

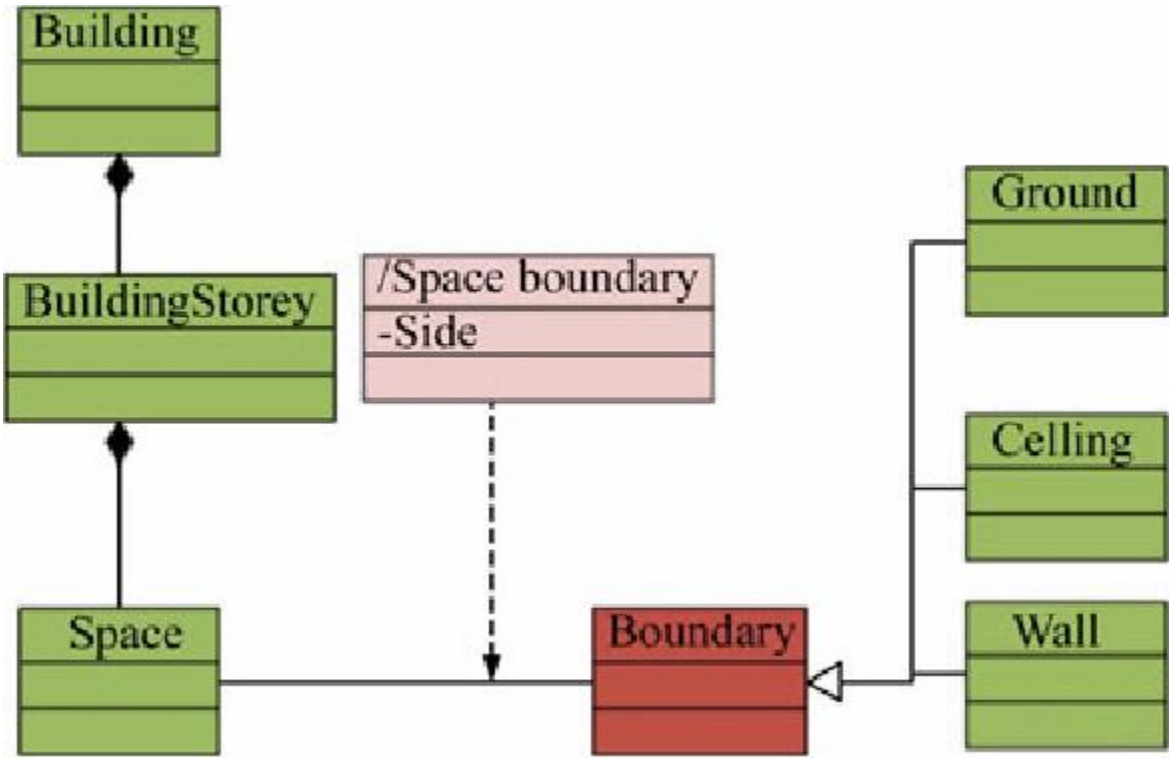


Fig 1.5: Sequence Diagram of the application

Block Diagram

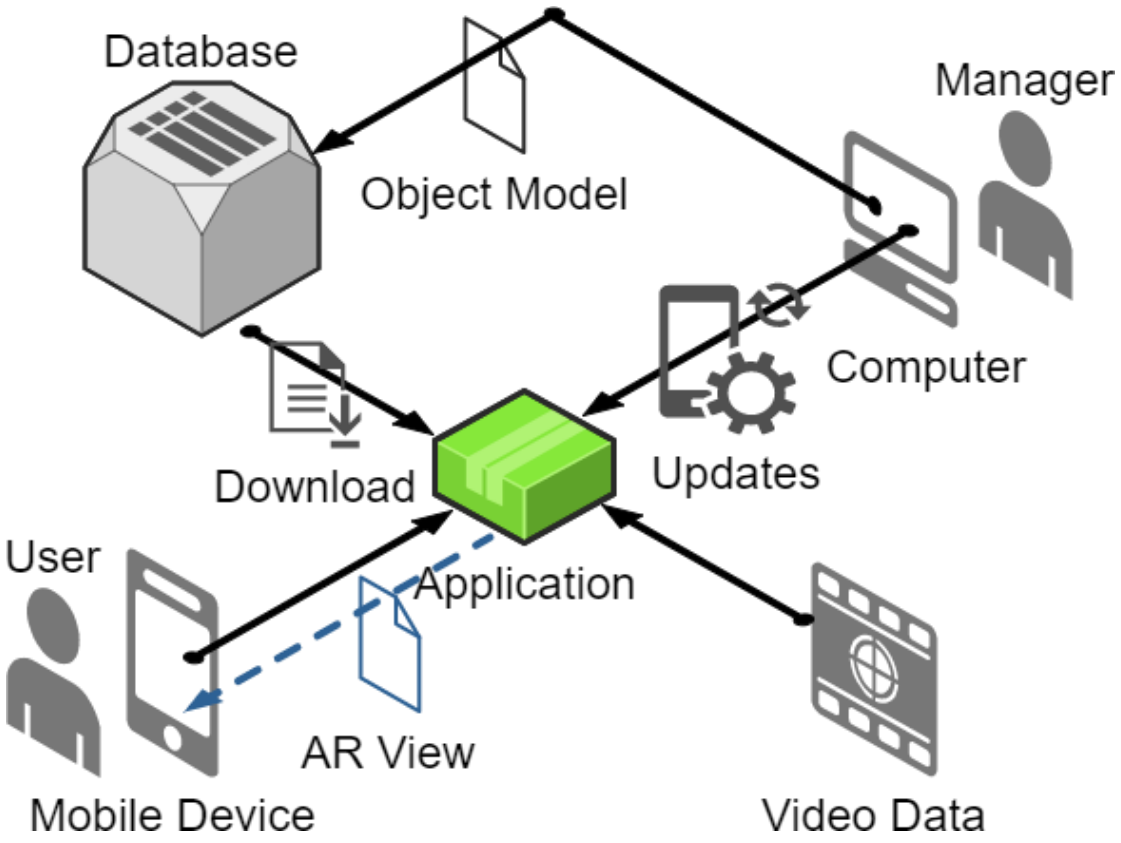


Fig 1.6: Block Diagram

Implementation Issues and Challenges

A few implementation issues and challenges have been foreseen during application development. The main challenge is to work with 3D object models which can be highly complicated and complex, especially if a new 3D object has to be created. 3D objects are tough to deal with because almost all display systems are in 2D, while

3D is only an imaginary object which shapes and sizes change when rotated. Therefore, it is important to have the correct formula and algorithm to accurately display 3D models in AI.

Besides, online mobile application is the next challenge that will be faced during development. Mobile application has yet to be learned from the courses taken throughout the degree, while minimal knowledge is known, it is relatively difficult to take up a project that belongs to a new field; although the programming language used is Dart which is very new and little bit difficult. In addition, creating an application that utilises online platform is fairly demanding because of security issues, too many options available, connection problems, large file size and data reliability issues.