
Proposal for a One Stop Portal for finding the Ideal Resale HDB - HouseHunt

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Team 5

School of Computer Science & Engineering

Nanyang Technological University

Submitted to—
Dr Althea Liang

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1. Executive Summary

With the advent of the COVID-19 pandemic, the Singaporean real estate market has undergone some major changes. Its current state is extremely volatile and HDBs are susceptible to price fluctuations. The current market is confusing to first-time buyers and sellers due to the vast amount of data available. Moreover, it is difficult to stay up to date with the real estate market due to its erratic nature and the effects of external unforeseen circumstances such as multiple lockdowns to control the proliferation of COVID-19.

We propose a web based flat resale tool, 'HouseHunt,' that estimates the value of real estate sellers' flats based on factors such as flat type and model, locality, remaining lease and floor area. HouseHunt also caters to potential buyers searching for their own HDB accommodation. By collating the large amounts of real estate data provided by the government and catering it to the users' preferences, HouseHunt provides an easy-to-access and convenient system to navigate the turbulent housing market. Moreover, HouseHunt provides them with multiple options based on their inputs for the users to be able to find their ideal resale HDB.

2. Statement of Problem

The Singapore housing market is ever-changing. Buyers and sellers need a one-stop destination to solve the problems they face when entering the housing market. Singapore's real estate prices are highly dependent on a multitude of factors, which can be overwhelming to novice users. Moreover, the recent pandemic has caused a wave of cancellation of Build-to-Order. As a result, even experienced users may face confusion with regards to the impact it has on the resale market (Lin, 2021). Thus, there is a need for a comprehensive and robust solution for price estimation.

Young Singapore Adults factor several key factors when they have to purchase their first HDB. The most deciding factor for them is the location (Lim, 2021). More specifically, how close their HDB is with respect to public transport, schools and shopping centres. Furthermore, as previously mentioned, the recent pandemic had made many young home buyers recalibrate their choices as prices of such flats had ballooned beyond their budgets (Ting, 2021).

Weighing all these factors could pose an issue when all the datas are presented by their property agent as they may be bombarded by information they do not know what to compare with. This could lead to decision fatigue and ending up purchasing a HDB flat that they are not satisfied with. It is no wonder that 88 percent of Singapore consumers are unhappy with the current HDB market (Yong, 2018).

Given the volatile state of the Singaporean real estate market, there is a need for a comprehensive and cogent solution that collates currently available real estate information and presents it based on users' priorities. HouseHunt aims to be the one-stop solution to the average Singaporean's real estate needs by focussing on ease of access and reliability.

3. Objectives

This document proposes HouseHunt, a website application built with the Django web framework, designed to assist Singaporean users on resale flat related information.

- 1) Information provided includes flat finding based on certain criteria;
- 2) Estimations of resale flats prices based on recent data,
- 3) House affordability calculations using user's income information
- 4) Data visualisations of house prices against certain parameters such that users can understand the pricing trends in Singapore

1. The system allows users to either search for a resale flat, calculate their house affordability, estimate the flat price of a resale flat, or view data visualisations of resale flat prices against towns, flat types, or year of sale.

2. If the user chooses to estimate the selling price of the flat, then the system must allow the user to input the location, flat type, flat model, remaining lease of the flat and floor area of the flat. All fields must be filled. Upon submission, the system will then return a selling price estimate of the flat based on these inputs. If the system is unable to provide an accurate estimate, the system must notify the user.

3. If the user chooses to calculate their house affordability, then the system must allow the user to input their down payment, monthly income, debts, and interest rate of the loan they are planning to take. Upon submission, the system will then return the house affordability of the user. Furthermore, they can choose to search for a flat with the returned house affordability as their maximum price.

4. If the user chooses to view data visualisations, the system must allow the user to choose between viewing house prices against town, flat types, or year of sale. Upon choosing, the system must return an image of a graph depicting their choice.

4. Technical Approach

To help us ensure that the website interface is user-friendly and tackles the peoples' needs so that users will have a positive experience, we have come up with a set of target specifications, technological considerations and system architecture.

4.1 Identification of Customer Needs

If budget and time constraints permit, with sufficient resources we could conduct a survey or focus group interviews amongst Singaporeans looking to buy or sell their HDB flats to ascertain their needs.

4.2 Target Specifications

Some users may prefer the added convenience of viewing the HDB flat visually instead of just looking at the address. Interfacing with Google Maps API helps achieve this.

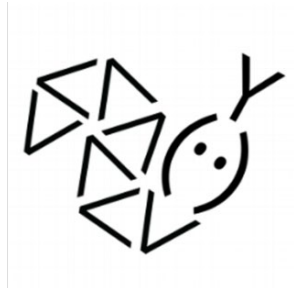
In addition, whilst one can use HDB's Resale Flat Prices portal to check the transacted prices for resale flats within the past 2 years (as seen below), some may prefer a single predicted price as compared to sifting through lots of spreadsheet data.

Search Results							
Flat Type		4 Room					
HDB Town		Tampines					
Resale Registration Date		Oct 2019 To Oct 2020					
Total number of records found		664 (Data as at 5 Oct 2020)					
Block / Nearby Amenities	Street Name	Storey	Floor Area (sqm) / Flat Model	Lease Commence Date	Remaining Lease	Resale Price	Resale Registration Date
137	Simei St 1	10 to 12	84.00 Simplified	1988	66 years 11 months	\$375,000.00	Oct 2020
253	Simei St 1	07 to 09	101.00 Model A	1996	75 years	\$543,000.00	Oct 2020
141	Simei St 2	07 to 09	104.00 Model A	1989	67 years 4 months	\$470,000.00	Oct 2020
234	Simei St 4	04 to 06	104.00 Model A	1988	66 years 10 months	\$412,000.00	Oct 2020
869A	Tampines Ave 8	10 to 12	92.00 Model A	2015	93 years 9 months	\$525,000.00	Oct 2020
519C	Tampines Ctrl 8	13 to 15	84.00 Dbss	2014	92 years 9 months	\$663,000.00	Oct 2020
345	Tampines St 33	07 to 09	105.00 Model A	1996	74 years 9 months	\$395,000.00	Oct 2020

Source: HDB

4.3 Technology Consideration

Software/Platform	Reason for use
<p>HTML/CSS + Bootstrap Framework</p>  	<p>The front-end of our website will be developed with the help of the Bootstrap framework. HTML and CSS file(s) will be used in the website as well, with the help of the Django templating engine.</p> <p>1) Functionality across multiple browsers</p> <ul style="list-style-type: none">• No matter what browser you use, you should still be able to access the website <p>2) Bootstrap Libraries</p> <ul style="list-style-type: none">• The Bootstrap frontend framework libraries help us to create responsive websites that scale according to size of devices. As such, accessing the website on phones or desktops is still a pleasant experience for the user.
	<p>Trello is a collaboration tool that organizes the project into boards. In one glance, Trello can indicate what's being worked on, who's working on what, and where something is in a process. This can help with the software management process</p>



Django is a “batteries included” web framework that provides a robust set of features for web development. It houses all the relevant models, controllers, configuration files and source code files. This code can then be deployed onto cloud platforms like Python Anywhere or Heroku for public access. Django 3.1.7 or later is required for the application to work smoothly. Django will expose endpoints following the Representational State Transfer (REST) protocol.



The Web Application uses a SQLite3 database to store the HDB resale flat data. The interfacing between the database and the backend is achieved through Django's Object-Relational Mapper (ORM).

GitHub



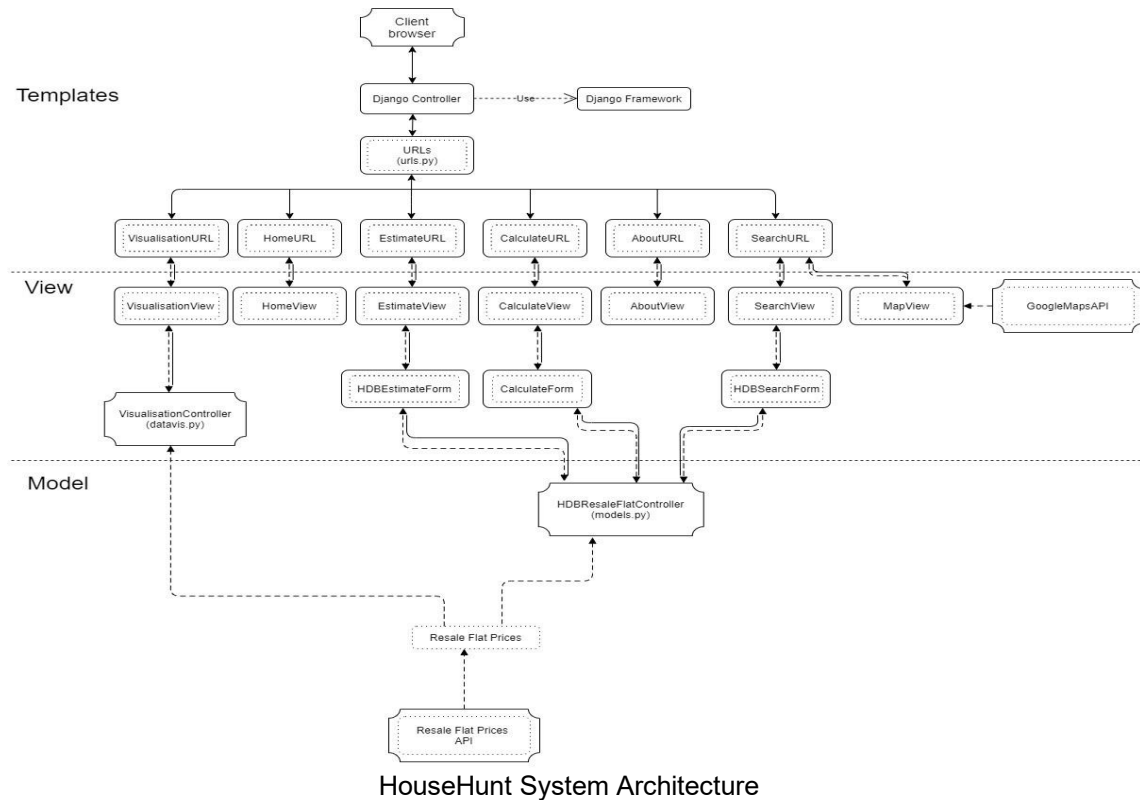
1) Decentralized Repository

- Individual Local Repository with a Centralized Remote Repository
- Everyone can have a copy of the code which they can edit and share by doing a commit

2) Version Control

- Tracks changes in code
- Can revert changes back to a previous commit

4.4 System Architecture/Platform



The website utilises the Django framework, which follows MVC pattern very closely, but uses a slightly different terminology. Django is essentially an MTV (Model-Template-View) framework. Django uses the term Templates for Views and Views for Controller. In other words, in Django views are called templates and controllers are called views. Hence our HTML code will be in templates and Python code will be in views and models.

For the applications of the observer pattern in MTV similar to in MVC, the template subscribes for changes to the model. The view receives the input from the users and then updates the model. The view updates the change and notifies all subscribers of the change. The template is notified and therefore updates its display, displaying the relevant results.

5. Project Management

A timeline of the team's project management is shown in the following Gantt chart

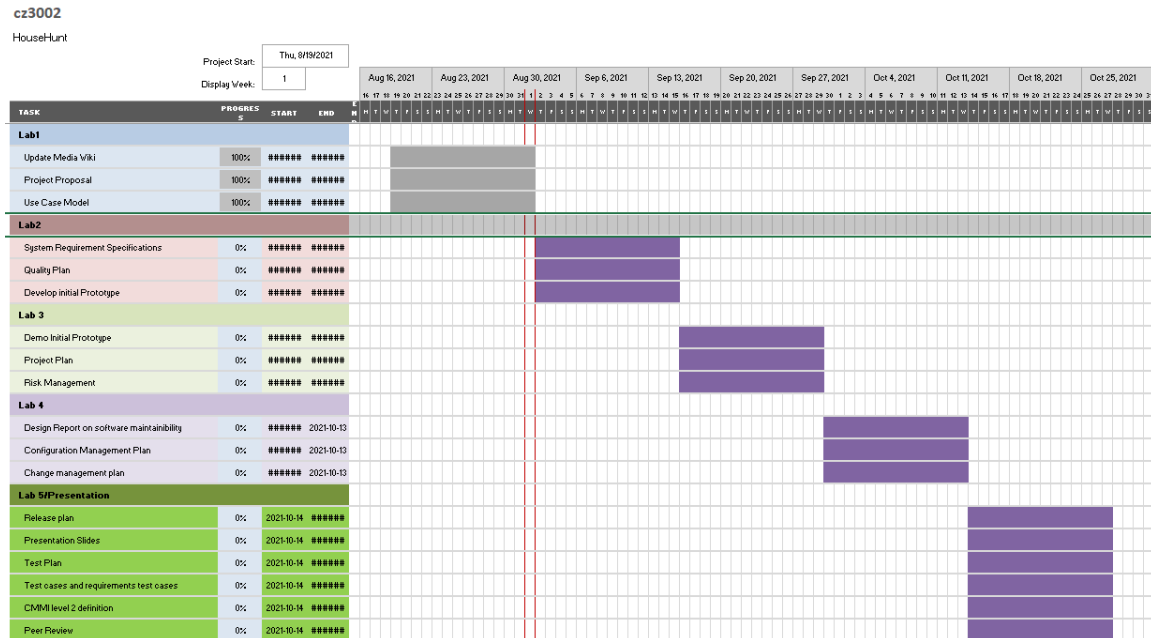


Figure 1: Gantt chart for the project. The grey bars indicate the portions of the tasks that we have accomplished.

5.1 Deliverables

Below is a status report on how we will be conducting our project to ensure that there will be sufficient time to conduct quality management at various steps of our project.

The team will ensure that by the end of week 4, we will have our project proposal ready, and everyone clearly understands the direction of it. This includes the sequence diagrams and use cases.

By week 6, the team will start working on building a prototype and prepare for quality management.

By week 7 and 8, we should have our project plan ready with the risk management in place and the necessary strategies.

By week 9, we should be ready to introduce our prototype and include various testings that we have done. This includes blackbox and whitebox testing.

The below table will contain a clearer view of the various involving members, deadlines and description for each of the critical project deliverables:

Project Deliverables	Estimated Deadlines	Participating Members	Description
Project Proposal	Week 4 (2 nd Sept 2021)	Project Committee	Project objectives, sequence diagrams and use cases are prepared in a document.
System Requirement Specification (SRS)	Week 5 (9 th Sept 2021)	Project Manager Lead Developer Front-end Developer Back-end Developer	List out function, non-functional and technical requirements.

Quality and Risk Management Execution	Week 5 (9 th Sept 2021) & Week 6 (15 th Sept 2021)	Project Manager QA Manager QA Engineer	Reporting of any problems and corrective actions. Software reviews and different controls should be documented.
Risk Management Plan	Week 6 (15 th Sept 2021)	Project Committee	Identifying and classifying risks, and finding corresponding corrective actions to mitigate the impacts of risks.
Test Plan	Week 7 (22 nd Sept 2021)	Project Manager QA Manager QA Engineer Release Manager	This includes creating and documenting UAT and SPT.
Prototype	Week 7 (22 nd Sept 2021)	Lead Developer Front-end Developer Back-end Developer	Initial prototype of the application.
Demo and Enhanced Prototype	Week 8 (7 th Sept 2021)	Project Committee	Demonstrate and receive feedback and work on improving the initial prototype.
Release Plan	Week 9 (14 th Sept 2021)	Lead Developer Front-end Developer	Release and approach strategy are documented.

User Manual	Week 10 (21st Sept 2021)	Project Manager Lead Developer	Manual for the user to understand how to navigate the web application.
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5.2 Budget

Below is an illustration of the estimated costs for initial design.

Item	Supplier	Quantity	Unit Price	Total
Front-End Developer	-	1	\$5,000	\$5,000
Back-End Developer	-	2	\$5,000	\$10,000
Quality Assurance Manager	-	1	\$4,000	\$4,000
Project Manager	-	1	\$4,000	\$4,000
Release Manager	-	1	\$4,000	\$4,000
Computers	DELL	6	\$1,000	\$6,000
Office Rental	NTU	1	\$6,000	\$6,000
Router	TP-Link	1	\$35	\$35
Main Power Supply	PUB	1	\$500	\$500
			Total	\$39,535

5.3 Communication and Coordination with Sponsor

Below is the table that highlights how our team will communicate and coordinate internally as well as how we will communicate externally with our sponsors. Here, we have included the purpose, the means and frequency of communication, and the required parties involved.

Purpose	Communication Channel	Frequency	Required Participants
Internal Communications			
Project Meetings: <ul style="list-style-type: none">• Task Progression• Projected Tasks to Complete• Review and Update	Face-to-Face	Fortnightly	The project team members
Prototype Development <ul style="list-style-type: none">• Development of the application• Formulating test cases and perform black-box and white-box testings	Teleconference (Zoom) or Messaging Services (Telegram)	Weekly	The project team members
Emergency Meetings <ul style="list-style-type: none">• Unforeseen circumstances• Urgent actions required	Teleconference (Zoom) or Messaging Services (Telegram)	When Needed	Relevant project team members

Testing <ul style="list-style-type: none"> • Testing Use Cases • Fixing any bugs 	Face-to-Face	After having developed the prototype	The development and quality checking team
External Communications			
Project Progress Review <ul style="list-style-type: none"> • Updating sponsors with regards to the progress of the project • Requests (if any) for any modifications in the project • Plans for future progression • Allocating a date for the next meeting 	Face-to-Face, Email and Teleconference (Zoom)	Monthly and When Requested or Necessary	Sponsors, Project Team Members, Stakeholders
Presentation <ul style="list-style-type: none"> • Demonstration of Prototype • Showcase of Final Product 	Face-to-Face, or Teleconference on Zoom if covid regulations tightens	After completion of project	Sponsors, Project Team Members, Stakeholders

5.4 Team Qualifications

Our team comprises of six highly committed individuals with different technical and soft skill sets. We always ensure that the work we produce is of top quality for our clients and sponsors alike.

Tang Kai Wen, Alvin (Project Manager): Alvin specializes in designing the most cost-effective system architecture based on the customer criterias and specifications. He dissects the entire problem into manageable pieces and explains key parts in detail to the customer before formulating the most suitable solution to tackle the original problem. With this, he has led multiple projects as Project Lead and has experience in both front-end and back-end technologies like flutter and firebase respectively.

Yong Wen Shiuan (Lead Developer): Wen Shiuan is a relatively experienced developer who was previously the main developer of a website with a Django backend. In addition, he has also contributed to the development and deployment of a RESTful backend API for an online educational game, powered by Django REST framework. This puts him in a good stead to take on the lead developer role for this project.

Bankata Mishra Spriha (QA Manager and Engineer): Spriha is a passionate developer with experience in software testing. She prioritizes client needs to ensure satisfaction with the system. She is meticulous and detail-oriented, making her a good fit for the role of QA Manager.

Suhana Gupta (Front End Developer): Gupta possesses a keen eye for design and front end application development. With her experiences in various aspects of software development, she has also been known for creating professional and aesthetic UI/UX designs that exceed the client's expectations. Her experience makes her ideal as a Front-end developer.

Heng Fuwei, Esmond (Back End Developer): Esmond is energetic and eager to learn new skills. With his experiences in various programming skills in backend programming such as manipulating data in databases and backend programming languages, His knowledge makes it the priority reason why he is chosen for being the back-end developer of the application.

Heng Chor Chen, Sabrina (Release Engineer/Manager): Sabrina is detail oriented with 4 years of leadership experience in her secondary education. With her previous experience in her technology internship, she has also contributed to ensuring tenants' satisfaction with focus and timely delivery of technical solutions. This makes her a good fit as the team's release manager.

6 Conclusion

HouseHunt will be the one-stop website portal for young adults to find their ideal resale HDB adjusted accordingly to their personal finance, which is especially crucial when finance is one of the priority concerns for young adults during the on-going COVID-19 financial recession. They will be empowered with the knowledge and tools to better fit their needs when purchasing their HDB flats. These will be a great attracting factor to bring in more of our target audience to adopt our one-stop HDB portal as their main search engine.

Together with a promising development team and well-thought out project plan, HouseHunt promises to be a resourceful and intuitive platform for finding the ideal resale HDB.

7. References

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- Lim, J. (2021). Young homeowners who bought ageing flats: What's the deal?. Retrieved 1 September 2021, from <https://www.todayonline.com/singapore/young-homeowners-who-bought-ageing-flats-whats-deal>
- Ting, P. (2021). The Big Read: Rising prices, building delays — young couples face perfect storm in quest for home sweet home. Retrieved 1 September 2021, from <https://www.channelnewsasia.com/singapore/big-read-rising-property-prices-building-delays-young-couples-1338166>
- Yong, N. (2018). Retrieved 1 September 2021, from <https://www.propertyguru.com.sg/customer-service/press-releases/propertyguru-consumer-sentiment-survey-reveals-a-l>

8. Appendix A: Résumés of Team Members

The following pages present one-page résumés of the team members for this project.

EDUCATION

Nanyang Technological University, Singapore

Sep 2019 – Ongoing

Bachelor of Engineering (Computer Science) with a Second Major in Business

- Expected Honours (Distinction), Current CGPA: 4.02/5.00

ACADEMIC PROJECT

Nanyang Technological University, Singapore

Aug 2019 – May 2020

Canteen Info System – Designed a system for students to track the queue timing-sharing system

- Developed a non-profit system to enhance the students quality of life using pygame
- Optimised the way estimate waiting time is calculated to provide results with accuracy
- Validated results at beta-testing stage by allowing students to test our system

MySTARS – Recreated and improved on the current NTU Course Registering

- Developed a non-GUI based Java system with features based on the current course registration process
- Streamlined the interaction procedures for students to swap courses with one another

PowerUp – Allow users to find extracurricular activities offered by Community Centers and Vendors via a mobile application

- Diagnosed the bugs in the application to allow proper interaction between the flutter and sqlite
- Introduced a new digital way to allow Singaporeans to have better access to the resources provided by the Government

SSADungeon – Provide students a fun way to learn a NTU course module via gaming which teachers can use to track the progress

- Conceptualized the stated features through Flutter and Dart to create the SSADungeon as an android application
- Collaborated with 9 other people to formulate the Software Requirement Specifications (SRS)
- Demonstrated and presented the whole application to a group of students and the professor in charge

WORK EXPERIENCE

Ellenborough Market Cafe

Jun 2019 – Sep 2019

Steward & Operations Assistant

- Streamlined a more efficient employees shift management for easier processing of employees shift daily, resulting in a reduced risk of miscommunication regarding work shift hours
- Convinced the manager-in-charge to integrate the updated shift management for the afternoon and night shifts

CO-CURRICULAR ACTIVITIES

Student Council

Jan 2015 – Jun 2016

Head of Operations

- Managed a student-welfare event, secured a total of \$1,000 worth of additional money through campaigning via Social Media and reaching out to the student community
- Oversaw reorganizing efforts and developed efficient strategies to deliver consistent services to the student body reaching an increased usage of council's beneficial services throughout the term

Freshmen Orientation Camp

Jan 2016 – Feb 2016

Human Resource & Finance Leader

- Established the proper channel for money collection and food distribution for 1200 freshmen and 200 orientation leader to ensure the accountability of our services
- Interviewed, selected and trained 200 orientation leaders on orientation skills during a one and a half day workshop to strengthen their ability to excite and orientate the freshmen as well as refine the services and channels previously designed

SKILLS

Languages: Proficient in English and Chinese, conversant in Cantonese

Software Skills: C++, Python, Java, Excel Visual Basic, Photoshop, Microsoft Office, VrmilPad, SQLite

YONG Wen Shuan | Mobile No.: +65 85901196 | Email: C190170@e.ntu.edu.sg
GitHub: <https://github.com/yws888>

EDUCATION

Nanyang Technological University, Singapore Aug 2019 – May 2023 (Expected)
Bachelor of Engineering - BE, Computer Science

Raffles Institution, Singapore Jan 2011 – Dec 2016
Singapore - Cambridge GCE Advanced Levels

ACADEMIC PROJECTS

Nanyang Technological University, Singapore Jan 2021 – Apr 2021
Software Engineering Project

Title: Building A Smart Nation

- Coded and deployed a functional website using Django, HTML, CSS and a SQLite database for viewing and searching HDB resale flat data
- Created feature to view HDB resale flat location on Google Maps

Nanyang Technological University, Singapore Jan 2021 – Apr 2021
Software Systems Analysis & Design Project

Title: Online Educational Game

- Coded and deployed the backend API for an educational game, together with a team, using Django REST Framework and involving a MySQL database

Nanyang Technological University, Singapore Jan 2020 – Apr 2020
Introduction to Data Science & Artificial Intelligence Project

Title: Prediction of AirBnB Superhosts

- Performed data cleaning on site data scraped from AirBnB
- Conducted steps in the data science pipeline such as feature selection, model training, and optimisation; using Jupyter Notebook as well as Python libraries such as scikit-learn and pandas

WORK EXPERIENCE

Singapore Armed Forces (SAF) Aug 2017 – Jan 2019

Field Engineer (Pioneer) in the 2nd Singapore Infantry Regiment (2SIR)

- Participated in activities such as CSB, Exercise Lancer in Brunei, ATEC
- Collaborated and communicated with people from varied backgrounds
- Awarded Company Soldier of the month in Aug 2018

CO-CURRICULAR ACTIVITIES & VOLUNTEER EXPERIENCE

National Cadet Corps Jan 2011 – May 2014
Member

- Participated in Specialist Course at NCC HQ

Raffles Canoeing Jan 2015 – Jun 2016
Member

- Participated in Singapore Canoe Marathon and National Inter-Schools Canoeing Championships

St. Hilda's Services May 2019 – Jun 2019
Temp Store Packer

- Partook in packing of the store of food supplies
- Analysed ways to pack the store efficiently

SKILLS & INTERESTS

Languages: English, Chinese

Programming: Python, Java, C, HTML

Software Applications and Frameworks: Django, Django REST Framework, Daz Studio, GitHub, Linux

Interests: Listening to Music, Soccer, Gaming, Chess, 3D Modelling

Spriha Bankata Mishra

Phone: (65) 85899041 | E-mail: sprihabankata@gmail.com

EDUCATION

Nanyang Technological University, Singapore

Aug 2018 – Jul 2022 (Expected)

- **Bachelor of Engineering (Computer Science)**
- Expected Honours (Distinction), Current CGPA: 4.42/5.00
- Relevant Modules: Data Structures, Algorithms, Object-Oriented Design and Programming, Data Science and Artificial Intelligence, Software Engineering, Databases, Software Systems Analysis and Design, Neural Networks and Deep Learning, Data Analytics and Mining

WORK EXPERIENCE

Seagate Technology PLC

Trusted Drive Cryptographic Infrastructure (TDCI) Application Intern

May 2020 – Jul 2020

- Leveraged BouncyCastle and OpenSSL libraries to generate PEM certificates, EFI files, and detached digital signatures for UEFI images.
- Migrated Unix-based Secure Boot signing tools from C to Java for compatibility with Windows systems.

ACADEMIC PROJECTS

Nanyang Technological University, Singapore

Undergraduate Research Experience on Campus

Sep 2019 – Jul 2020

Title: Deep Learning in Hand Pose Estimation

- Devised a deep learning algorithm for hand pose estimation to output a real-time stream of regressed hand pose skeleton via a Region Ensemble Network, achieving a mean error of 7.61mm.
- Documented findings, conclusions, and scope (i.e. diagnosing disorders such as Rheumatoid Arthritis) in a 6-page report.

Software Engineering Project

Feb 2020 – Mar 2020

Title: PlantCare

- Created an Android mobile application tracking the health and water requirements of plants for amateur gardeners leveraging weather, soil, and related information from public government APIs.
- Implemented MVC (model-view-controller) architecture in Android Studio to achieve high scalability and easy extension.

Object Oriented Design & Programming Project

Feb 2020 – Mar 2020

Title: Hotel Reservation and Payment System

- Modelled an application in Java to computerize the processes of making hotel reservations, recording orders, and displaying records.
- Applied SOLID design principles while designing classes for high cohesion and readability of code while maintaining required levels of abstraction.

SKILLS

- **Languages:** English, Hindi, Bengali
- **Skills:** Python, Java, C, C++, HTML, CSS, Microsoft Office, Raspberry Pi, Arduino, TensorFlow, MATLAB, MySQL, CUDA, OpenCV, Unity 3D Programming, VRML, Unix, Git, Pygame

SUHANA GUPTA

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EDUCATION

Nanyang Technological University, Singapore
Major: Bachelor of Engineering (Computer Science) August 2019- Present
Minor: Film

Vasant Valley School, New Delhi, India January 2007- May 2019
Central Board of Secondary Education Grade 10 March 2017
Cumulative GPA- 9.60/10
Certificate of Merit, Grade Card Distinction (2016 & 2017)

All India Secondary Examination (Grade 12) March 2019
Score: 97.5%
(Stood 1st in Science stream in school and 3rd overall)

WORK/INTERNSHIP EXPERIENCE

Verticurl (a WPP Company) Singapore
Intern for Client Services and Business Development May – August 2021

- Tested checkout and website flow for product competitors across four markets, and did data analysis on the same

Novis Tec Software Company New Delhi, India
Intern for Software Development June – July 2020

- Worked in logistics and administration, assisted in the development of a social-event management application using Django

McCann World Group (Omnicom) New Delhi, India
Social Media Group for General Motors account June 2017

- Researched branding and communication activities for clients and pitched ideas with the team. Worked with the creative department to develop new and innovative ways of marketing the client's products.

LEADERSHIP (VASANT VALLEY SCHOOL)

School House Captain 2018-19

- Helped organise intra-school events and lead a school house during various competitions.

Member of the Academic Council 2017, 2018
Member of the Environment Council 2015, 2016, 2017

VOLUNTEER WORK

Sona Skill Development Centre (Gurgaon, India) 2016
Assisted in teaching English to a group of young adults

Jeevashram Foundation Veterinary & Animal Welfare Hospital 2016-Present
Volunteer for care and treatment of stray animals in my community

OTHER ACTIVITIES

Red Cross Youth (NTU Chapter)
Main Committee Head of Fundraising 2021-Present
Secretary & Treasurer, Head of Publications (Fund-raising Committee) 2019-2021

- Responsible for creating and handling posters, graphics and social media advertisements. Working closely with committee heads to conduct budgeting and organise fundraising events including donation drives.

URECA (NTU) (*Research Project with NTU Assoc Professor Ina ~~Conradi~~ Chavez*).

2020-2021

- Studying Computational Creativity and the usage of Artificial Intelligence in creating Art. Learning the basics of Derivative Touch Design using Python to help animate large datasets.

Computer Science & Engineering Club (CSEC)

2019-Present

Publicity & Publications Sub-committee for Social Media

- Responsible for the designing of merchandise, event posters, and social media posts

SKILLS

Languages: Proficient in spoken and written English and Hindi

Programming and Database Languages: Proficient in C++, Python, Java, C, Flutter (Dart) and SQL

Computer: Photoshop, Canva, Microsoft Office Suite, Social Media Platforms

Interests: Art, Photography, Softball and Football

Heng Fuwei, Esmond | Mobile No.: 88366118|
[Email:esmond2727@gmail.com](mailto:esmond2727@gmail.com)

EDUCATION

Nanyang Technological University, Singapore

Aug 2019 – Current

Bachelor of Engineering (Computer Science)

Nanyang Polytechnic, Singapore

April 2014 – March 2017

Diploma in Business Intelligence & Analytics

Ang Mo Kio Secondary School, Singapore

Jan 2009– December 2014

ACADEMIC PROJECT

Nanyang Polytechnic, Singapore

February 2016 – May 2016

Final Year Project – Design a Contact application for apple and android phones

- Developed a system to manage contacts efficiently and effectively
- Allow event planning and schedule
- Receive and send out newsletter to other companies
- Sharing contacts to other users

INTERNSHIP EXPERIENCE

IBM

Jun 2016 – Oct 2016

Operations Processes Department, Intern

- Worked closely with 3 IT developers create and debug an application for other company. Gathering feedbacks from the other company daily on bugs found
- Facilitated in fixing and debugging bugs found

Winsys Technology PL

Software Developer Intern

- Worked closely with 3 IT developers create and debug an application for company. Gathering feedbacks from company colleagues daily on bugs found
- Facilitated in creating the frontend backend using Node.js, Microsoft Visual Studio , Mysql Workbench Database
- Insert, edit, delete data into database

CO-CURRICULAR ACTIVITIES

Audio System Club

Jan 2009 –

November 2013

Chairman, Hall IC, Monitor,

- Managing students and planning timetable to allow active participation for all members during events
- From an inexperience to master the skill of audio equipment to assist School event, celebration, graduation, open house

Library Champion

April

2014 – March 2017

Programmes Committee Member

- Planned games and camp activities for all students to encourage interaction and bonding in the school library
- Encouraging more people to come visit the library to have fun and distress themselves from studies

SKILLS

Languages: Proficient in English and Chinese

Digital Skills: Word, C++, Excel, Tableau, Photoshop, Microsoft Office, ~~SQL Database~~, Android Studio, ~~Xcode~~

HOBBIES & INTERESTS

Travelling, Listening Music, playing games

Sabrina Heng's Resume

Mobile No.: 9735 2318

Email: heng0222@e.ntu.edu.sg

EDUCATION

Nanyang Technological University, Singapore

Aug 2019 – May 2023

Bachelor of Computer Science with a Minor in Business (Hons)

- **Relevant Modules:** Algorithms, Data Structures, Object Oriented Design and Programming, Introduction to Database, Software Engineering, Artificial Intelligence, Advanced Computer Architecture

ACADEMIC PROJECTS

Nanyang Technological University

Aug 2020 – Dec 2020

Module:

Software Engineering

- Developed 3D Navigation Application for users in NTU to find their way around NTU easily using Unity.
- Utilised Black-Box and White-Box testing to test Software Functionality.

Object Oriented Design and Programming

- Created an application with my team members to replicate NTU Stars (Add/Drop of modules, and planning of timetable for students before semester starts).
- Development leader for front-end of the application.

WORK EXPERIENCE

Krislite (Administrative) |

Jan 2019 – July 2019

APM Property Management (Summer Internship)

Jun 2021 – Aug 2021

- Used PHP to do up a web application as a platform between stores in Suntec City and customers who are doing takeaways during the heightened measure phase.
- Made use of HeidiSQL to resolve tenants' issues by mining data from database.

Private Tutor

Jan 2019 –

AIA Financial Advisory

Feb 2021 –

- Currently working part time, gaining knowledge in business and finance industry while working on IT skills in school

CO-CURRICULUM ACTIVITIES

Badminton

Aug 2019 – Jun 2020

Team Member (NTU)

- Played for NTU during competitions such as SUNIG and IVP. Emerged top 3 for girls' badminton.

Freshmen Orientation Camp

Jun 2020 – Aug 2020

Programmes Committee Member

- Planned games and camp activities for 500 freshmen to encourage interaction and bonding for 4 to 5 days.

SKILLS / COMPETENCIES

Digital Skills: Python, MATLAB, C+, HTML, JavaScript, SQL

Languages: Proficient in English and Chinese