🤖 comp90082-2024-na-koala

Team

Team

Y Owned by yucpeng1 • Updated 42 minutes ago

Name Student ID Email Position Responsibility Bowen Fan 1035162 bffa@student.unimelb.edu.au Product Manager/Frontend Developer Leads project direction and user interface development, ensuring alignment with user needs and seamless backend integration. Tianqi Wang 1045939 tww2@student.unimelb.edu.au Scrum Master/ROS Analyst Facilitates Agile process

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Project Brief

Project Brief

Y Owned by yucpeng1 • Updated 21 hours ago

Product Requirement https://comp90082-2024-na-koala.atlassian.net/wiki/spaces/comp900822/pages/5931187 DO-BE-FEEL https://comp90082-2024-na-koala.atlassian.net/wiki/spaces/comp900822/pages/6160515 Goal Model https://comp90082-2024-na-koala.atlassian.net/wiki/spaces/comp900822/pages/6094979

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Requirements & Design

Requirements & Design

Y Owned by yucpeng1 • Updated 21 hours ago

Target release Type // to add a target release date Epic Type /Jira to add Jira epics and issues Document status DRAFT Document owner @ mention owner Designer @ designer Tech lead @ lead Technical writers @ writers QA 🕵️ Project Overview The ROSAnnotator project aims to develop a standalone web application specifically designed to enhance the an

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Sprint Goals

Sprint Management

Y Owned by yucpeng1 • Updated 2 days ago

Sprint Tasks (Trello Board) https://trello.com/b/0RMtLBnV Sprint 1 Deliverables https://comp90082-2024-na-koala.atlassian.net/wiki/spaces/comp900822/pages/3932161

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Meeting Notes

Meeting Notes

TW Owned by Tianqi Wang • Updated 3 days ago

Meeting Notes Incomplete Tasks Decisions

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Stand Up Meetings

Stand Up Meetings

Y Owned by yucpeng1 • Updated 3 days ago

Daily Stand Up

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🧑‍💻 Team

Name	Student ID	Email	Position	Responsibility
Bowen Fan	1035162	bffa@student.unimelb.edu.au	Product Manager/Frontend Developer	Leads project direction and user interface development, ensuring alignment with user needs and seamless backend integration.
Tianqi Wang	1045939	tww2@student.unimelb.edu.au	Scrum Master/ROS Analyst	Facilitates Agile processes and analyzes ROSBag data to guide development with actionable insights.
Guanqin Wang	1074138	guanqinw@student.unimelb.edu.au	DevOps Manager/Backend Developer	Manages infrastructure and backend development, focusing on performance, data processing, and system integration.
Yujie Zheng	1290137	yujiezheng@student.unimelb.edu.au	Backend Developer	Develops server-side logic and database interactions, ensuring efficient data handling and API functionality.
Yuchen Song	1377108	yuchsong2@student.unimelb.edu.au	Frontend Developer	Creates and improves the web application's visual elements and user experience, ensuring an intuitive and engaging interface.
Yucheng Peng	1382861	yucpeng1@student.unimelb.edu.au	ROS Analyst	Specializes in ROSBag data analysis, developing tools and algorithms for effective data interpretation to inform application features.
Abhishek Tummalapalli	1066956	atummalapall@student.unimelb.edu.au	ROS Analyst	Specializes in ROSBag data analysis, developing tools and algorithms for effective data interpretation to inform application features.

💪 Project Brief

Product Requirement

Requirements & Design

Y Owned by yucpeng1 • Updated 21 hours ago

Target release Type // to add a target release date Epic Type /Jira to add Jira epics and issues Document status DRAFT Document owner @ mention owner Designer @ designer Tech lead @ lead Technical writers @ writers QA 🕵️ Project Overview The ROSAnnotator project aims to develop a standalone web application specifically designed to enhance the an

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DO-BE-FEEL

DO-BE-FEEL

Y Owned by yucpeng1 • Updated yesterday

DO-BE-FEEL table for ROSAnnotator Project Reference： https://comp90082-2024-na-koala.atlassian.net/wiki/spaces/comp900822/pages/6094979 Users DO (Functional Goal) BE (Quality Goal) FEEL (Emotional Goal) Researchers in HRI Efficiently load, visualize, and analyze ROSBag data for HRI experiments. Empowered as leading innovators in th…

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Goal Model

Motivational model

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Goal Model Reference: https://comp90082-2024-na-koala.atlassian.net/wiki/spaces/comp900822/pages/6160515

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Project Overview, Background and Goal

Project spec: ROSAnnotator: A Web Application for ROSBag Data Analysis in Human-Robot Interaction | Notion

Project Overview

The ROSAnnotator project aims to develop a standalone web application specifically designed to enhance the analysis of Robot Operating System Bag (ROSBag) data, with a particular emphasis on Human-Robot Interaction (HRI). ROSBags are a crucial element in robotics research, serving as a standard format for logging and replaying messages within the ROS ecosystem. These logs can include a wide variety of data types, such as video streams, 3D point clouds, and custom messages tailored for HRI studies. The application is envisioned to be a versatile tool for researchers, enabling the loading of multiple ROSBags, integration with auto-transcription tools for audio data processing, and the provision of a synchronized, interactive dashboard for intuitive data visualization.

Background

Human-Robot Interaction (HRI) is a growing field of study that explores how humans interact with robots in various contexts, from industrial applications to personal assistance and beyond. The analysis of HRI data is complex, involving multiple modalities such as visual data, audio communications, and sensor data from the robot. The ROS ecosystem provides a flexible framework for robot development and research, but the analysis of ROSBag data, especially from HRI experiments, requires specialized tools. Existing tools like Elan offer some capabilities for annotation and analysis but may not fully meet the unique needs of HRI research, such as handling specific ROS data types or synchronizing multiple data streams.

Goal

The primary goal of ROSAnnotator is to fill this gap by providing a comprehensive tool that facilitates the detailed analysis of HRI experiments. The project focuses on several key objectives:

- **Data Handling Capabilities:** To build robust support for reading and parsing the diverse data types contained in ROSBags, ensuring researchers can access and analyze all relevant data components of their HRI experiments.
- **Synchronised Interactive Dashboard:** To develop an intuitive, user-friendly interface that displays various data streams in a synchronized manner, allowing researchers to interact with and analyze data more effectively.
- **Annotation Features:** To enable detailed annotations of HRI interactions, including custom scales for states (e.g., "child looking at the robot") and events (e.g., "child entering input on the table"), thereby enhancing the depth and specificity of analysis.
- **Integration and Automation:** Although given less priority initially, integrating with auto-transcription tools for audio data and exploring automatic annotation methods based on audio transcripts are also envisioned to streamline the annotation process and make the tool more versatile.

Project Specification with detailed Sprint planning

The project spec for ROSAnnotator outlines a comprehensive plan to develop a standalone web application for the analysis of ROSBag data, specifically focusing on Human-Robot Interaction (HRI). The objectives and methodology indicate a multi-phase approach to the project, emphasizing data handling, user interaction, and innovative features for annotation and analysis.

Specific Requirements & Story Points Estimation

Sprint 1: Requirement Analysis and Planning Phase

1. **Gather Detailed Requirements and Specifications**
   - Meetings with PhD students for requirements gathering.
   - Identifying user stories based on these requirements.
   - Story Points: 5
2. **Survey of Existing Annotation Tools**
   - Research and document features of existing tools (e.g., Elan).
   - Identify innovative features and best practices that can be integrated.
   - Story Points: 3

Overall Project Requirements (for reference and future sprints)

1. **Data Handling Capabilities**
   - Develop parsing capabilities for video streams, 3D point clouds, and `hri_msgs`.
   - Story Points: 8
2. **Multiple ROSBags Loading**
   - Implement a feature to manage and analyze multiple ROSBags.
   - Story Points: 5
3. **Integration with Auto-Transcription**
   - Connect with an auto-transcription tool for audio to text conversion.
   - Story Points: 5
4. **Synchronised Interactive Dashboard**
   - Design and implement a user interface for data visualization.
   - Story Points: 8
5. **Annotation Features**
   - Develop custom scales and annotation tools for users.
   - Story Points: 8
6. **Automatic Annotation Exploration**
   - Research and prototype automatic annotation methods.
   - Story Points: 5

Sprint 1 Tasks

For Sprint 1, the focus is on the initial phase of Requirement Analysis and Planning. Here's a detailed breakdown of tasks:

- **Task 1: Initial Team Meeting**
  - Objective: Align the team on the project's goals and methodologies.
  - Duration: 1 day
- **Task 2: Requirement Gathering Meetings**

- Objective: Conduct meetings with PhD students to gather detailed requirements.
- Duration: 1 week
- Deliverable: A requirements document outlining user needs and expected features.

- **Task 3: Research on Existing Tools**
  - Objective: Survey existing annotation tools and document their features.
  - Duration: 1 week
  - Deliverable: A comparison report highlighting potential features for ROSAnnotator.

Sprint Planning Notes

- **Sprint Duration**: 2 weeks.
- **Daily Standups** to discuss progress, obstacles, and next steps.
- **Review Meeting** at the end of Sprint 1 to evaluate the deliverables and plan for Sprint 2, focusing on System Design.
- **Retrospective Meeting** to discuss what went well, what didn’t, and how processes can be improved moving forward.

🎯 Requirements & Design

Target release	Type // to add a target release date
Epic	Type /Jira to add Jira epics and issues
Document status	DRAFT
Document owner	@ mention owner
Designer	@ designer
Tech lead	@ lead
Technical writers	@ writers
QA	

🕵️ Project Overview

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🎯 Objective

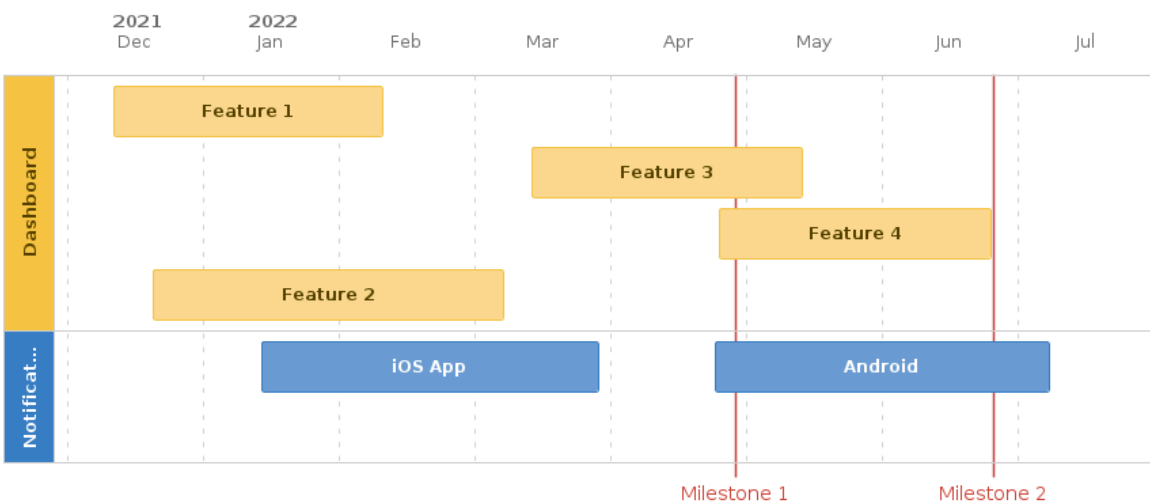
📊 Success metrics

Goal	Metric
Data Handling Capabilities	Built robust support for reading and parsing the diverse data types contained in ROSBags, ensuring researchers can access and analyse all relevant data components of their HRI experiments.
Synchronised Interactive Dashboard	Developed an intuitive, user-friendly interface that displays various data streams in a synchronised manner, allowing researchers to interact with and analyze data more effectively.

Annotation Features	Enable detailed annotations of HRI interactions, including custom scales for states (e.g., "child looking at the robot") and events (e.g., "child entering input on the table"), thereby enhancing the depth and specificity of analysis.
Integration and Automation	Integrating with auto-transcription tools for audio data and exploring automatic annotation methods based on audio transcripts are also envisioned to streamline the annotation process and make the tool more versatile.

🤔 Assumptions

🌟 Milestones



🗒️ Requirements

Requirement	User Story	Story Points

🎨 User interaction and design

❓ Open Questions

Question	Answer	Date Answered

⚠ Out of Scope

-

DO-BE-FEEL

DO-BE-FEEL table for ROSAnnotator Project

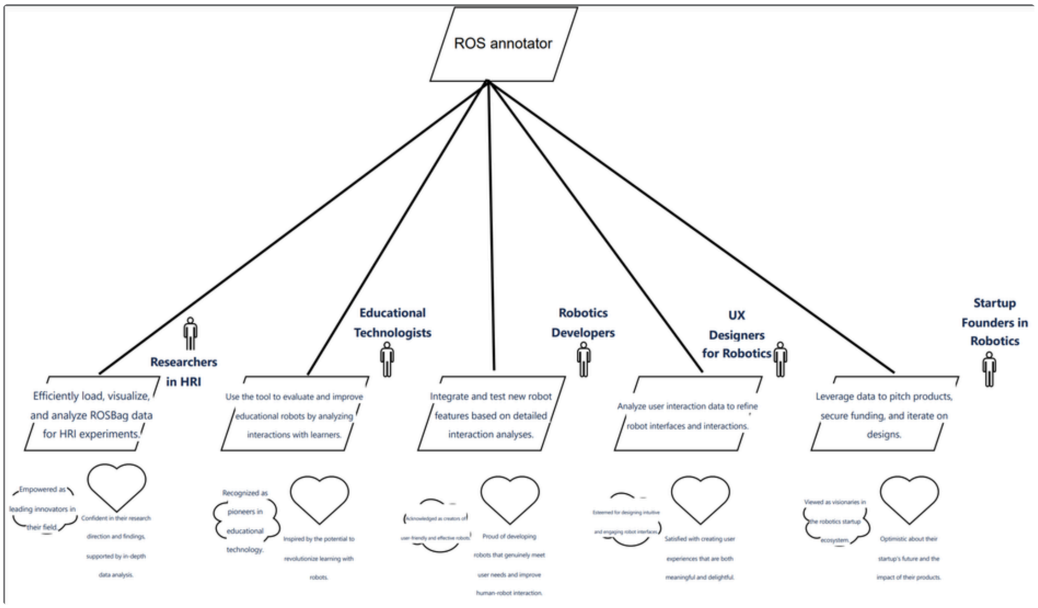
Reference : Motivational model

Users	DO (Functional Goal)	BE (Quality Goal)	FEEL (Emotional Goal)
Researchers in HRI	Efficiently load, visualize, and analyze ROSBag data for HRI experiments.	Empowered as leading innovators in their field.	Confident in their research direction and findings, supported by in-depth data analysis.
Educational Technologists	Use the tool to evaluate and improve educational robots by analyzing interactions with learners.	Recognized as pioneers in educational technology.	Inspired by the potential to revolutionize learning with robots.
Robotics Developers	Integrate and test new robot features based on detailed interaction analyses.	Acknowledged as creators of user-friendly and effective robots.	Proud of developing robots that genuinely meet user needs and improve human-robot interaction.
UX Designers for Robotics	Analyze user interaction data to refine robot interfaces and interactions.	Esteemed for designing intuitive and engaging robot interfaces.	Satisfied with creating user experiences that are both meaningful and delightful.
Startup Founders in Robotics	Leverage data to pitch products, secure funding, and iterate on designs.	Viewed as visionaries in the robotics startup ecosystem.	Optimistic about their startup's future and the impact of their products.

Motivational model

Goal Model

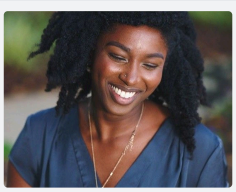
Reference: DO-BE-FEEL



Personas

Note:

- We've developed four personas for this project, tailored to its specialized use scenario, as the initiative is primarily aimed at research purposes.
- You can explore detailed information about each persona by clicking on their names.
- Clicking on the "User End Goal" will reveal their expected outcomes and what they hope to achieve with this product.
- The final column provides references to a list of user stories that may be applicable to each persona.

🌟 Persona 🌟	Name	End Goal	User Story
	**Dr. Emily Nguyen**	User Persona 1 | :light_bulb_on: Expectation	1.1 ~ 1.2 2.1 ~ 2.2 3.1 ~ 3.2 5.1
	**Alex Rivere**	User Persona 2 | :light_bulb_on: Expectation	1.1 ; 1.3 ; 1.4 2.2 ~ 2.4 3.2 ~ 3.4 5.2
	**Samira Campbell**	User Persona 3 | :light_bulb_on: Expectation	1.1 ~ 1.2 2.5 ~ 2.7 3.5 ~ 3.6 4.1 ~ 4.3

	**Rahul Sharma**	User Persona 4 | :light_bulb_on: Expectation	1.3 2.1 ; 2.2 ; 2.8 ~ 2.9 3.3 ; 3.7 ~ 3.8 5.2 ~ 5.3 6.1 ~ 6.4

User Persona 1

Persona name	**Dr. Emily Nguyen**
Persona role	Assistant Professor
Job description	Dr. Nguyen is an Assistant Professor in Robotics Engineering, specializing in Human-Robot Interaction (HRI) research, focusing on educational robots and their impact on children's learning.

🏛️ Institution

Institution name	TechnoFuture University
Institution size	Medium (500-1000 employees)
Industry	Education & Research in Robotics
Institution Description	TechnoFuture University, nestled in a bustling urban area, stands at the forefront of innovation in education and research, particularly in the field of robotics engineering. It offers a fertile ground for pioneering work in Human-Robot Interaction (HRI).

👥 Demographic information

Age	35
Gender	Female
Income	$80,000 annually
Education level	Ph.D. in Robotics Engineering
Residential environment	Urban

🖋️ Personal quote

- "Understanding the subtle cues in human-robot interaction can revolutionize educational technology."

📜 Biography

Dr. Emily Nguyen has been fascinated by robotics since her undergraduate years. After completing her Ph.D., she dedicated herself to research in HRI, specifically focusing on how robots can enhance learning experiences for children. She balances her time between teaching, conducting research, and contributing to academic journals. Emily is always on the lookout for innovative tools to better analyze and interpret interaction data between children and robots.

Professional goals	**Motivators**
• To pioneer research that improves robot design for educational purposes. • To develop methodologies for assessing and enhancing robot-child interaction.	• Passion for robotics and education. • Desire to make a significant contribution to the field of HRI. • The quest for finding efficient tools to streamline research processes.
Challenges	**Sources of information**
• Limited time due to teaching responsibilities. • Need for a comprehensive tool that simplifies the analysis of complex HRI data.	• Academic journals and conferences in robotics and HRI. • Online forums and communities dedicated to robotics research. • Collaboration with other researchers and industry professionals.

💡 Expectation

1. Professional ROS Data Analysis:

- Ability to efficiently load and parse ROSBag data containing diverse data types from HRI experiments, particularly those involving educational robots and children.
- Streamline process for identifying and analyzing human-robot interaction that can impact children's learning.

2. Synchronized Display of Multimodal Data:

- Seamless integration and synchronized display of video streams, 3D point clouds, and custom HRI messages to facilitate comprehensive analysis of robot-child interactions.
- High-performance visualization tools that can handle complex datasets without significant lag or processing delays.

3. Intuitive and Customizable Annotation:

- User-friendly interface for manual annotation of interactions, enabling detailed documentation of states (e.g., "child engaged with the robot") and events (e.g., "learning milestone achieved").
- Flexibility in defining and modifying annotation scales to suit specific research needs and objectives.

4. Data Preservation and Export:

- After completing annotations, the expectation is to easily save the annotated datasets in ROSBag format for future usage, sharing with the research community and school, or further analysis.
- Assurance of data integrity and the preservation of all original and annotated data elements within the ROSBag format.

5. Enhanced Research Productivity:

- Reduction in the time and effort required to analyze complex HRI data, allowing for more focus on deriving meaningful insights and developing educational robots.
- A tool that fits seamlessly into the research workflow, complementing existing methodologies and enhancing the ability to conduct rigorous scientific studies.

User Persona 2

Persona name	**Alex Rivere**
Persona role	Ph.D candidate
Job description	Alex is a Ph.D. candidate researching the impact of social robots in healthcare settings, with a focus on elderly care. His work involves understanding how interactions with robots can enhance engagement and companionship for the elderly.

🏢 Company

Company name	HealthTech Robotics Lab
Company size	Small (50-100 employees)
Industry	Healthcare & Robotics Research
Company Description	The HealthTech Robotics Lab is a pioneering research facility specializing in the intersection of healthcare and robotics. It is dedicated to developing advanced robotic systems designed to improve the lives of the elderly. The lab is renowned for its development of day-care robots that offer companionship and support to seniors living alone, addressing critical challenges in elderly care with cutting-edge technology.

👥 Demographic information

Age	29
Gender	Male
Income	$30,000 annually (stipend)
Education level	Pursuing Ph.D. in Robotics and Healthcare Interaction

Residential environment	Urban, shared apartment near the university

🖋 Personal quote

- "Robots have the potential to transform elderly care, making companionship accessible to all."

📜 Biography

Alex's journey into robotics began during his undergraduate studies in biomedical engineering. Inspired by the possibilities of improving lives through technology, he decided to pursue a Ph.D. focusing on the role of robots in elderly care. His research aims to identify factors that promote positive engagement between the elderly and robots, hoping to improve adherence to therapy and overall quality of life. Alex is dedicated to his research but faces challenges in analyzing complex interaction data efficiently.

Professional goals	**Motivators**
• To identify key factors that promote positive engagement between the elderly and social robots. • To contribute to the development of robots that can provide companionship and support to the elderly.	• A desire to improve the quality of life for the elderly. • The challenge of integrating technology and healthcare in meaningful ways. • The opportunity to contribute to groundbreaking research in HRI.
Challenges	**Sources of information**
• Analyzing complex and voluminous interaction data within limited time frames. • Finding user-friendly tools to facilitate the comparison of data across multiple sessions and participants.	• Academic journals in robotics, healthcare technology, and gerontology. • Conferences and workshops on robotics and healthcare innovations. • Online communities and forums dedicated to robotics research and healthcare technology.

💡 Expectation

1. Professional ROS Data Management:

- Alex expects the ability to efficiently load and analyze multiple ROSBag datasets from various scenarios collected in his lab.
- This feature is essential for conducting comparative analyses across different sessions and identifying patterns or discrepancies in the interaction data.
- The tool should accommodate the complexity and volume of data specific to elderly care scenarios, enabling streamlined analysis workflows.

2. Advanced Visualization Tools:

- He seeks advanced visualization tools capable of displaying data in a manner that allows for easy identification of key moments and patterns.
- Alex needs the capability to view 3D models of the environment to better understand the spatial dynamics between the elderly and robots, especially in contexts where the robot's mission includes preventing collisions with obstacles.
- The ability to select specific time points for detailed examination is crucial for dissecting interactions and environmental navigation.

3. Annotation and Improvement Tracking:

- Alex requires a user-friendly interface to annotate moments when the robot's performance did not meet expectations.
- This functionality should enable him to document instances of suboptimal interaction or navigation, facilitating a focused review and iteration process.

- The goal is to leverage these annotations to refine robot behaviour, ensuring safer and more effective companionship and support for the elderly.
- The tool must allow for easy modification and tracking of these annotations over time to measure progress and implement enhancements effectively.

User Persona 3

Persona name	**Samira Campbell**
Persona role	UX Designer
Job description	UX Designer at a large robotics company, specializing in designing intuitive interfaces and interactions for industrial robots to enhance safety and productivity on the factory floor.

🏢 Company

Company name	RoboTech Innovations
Company size	Large (Over 5,000 employees)
Industry	Robotics & Manufacturing
Company Description	RoboTech Innovations is a leading company in the field of industrial robotics, known for its commitment to manufacturing the most usable and safe robots on the market. Situated in a technologically advanced industrial park, RoboTech Innovations is dedicated to pushing the boundaries of robotics engineering, focusing on creating robots that enhance productivity and user experience in industrial settings.

👥 Demographic information

Age	32
Gender	Female
Income	$95,000 annually
Education level	Master’s Degree in Human-Computer Interaction

Residential environment	Suburban, owns a home

🖋 Personal quote

"Designing for humans means understanding every gesture and glance. Our robots need to be partners, not obstacles."

📜 Biography

Samira Campbell has always been passionate about the intersection of technology and human interaction. With a background in computer science and a master's in human-computer interaction, she embarked on a career in UX design focused on robotics. At RoboTech Innovations, Samira is tasked with making industrial robots not just tools, but collaborative partners for workers. Her challenge is to design systems that are both efficient and intuitive, ensuring safety and productivity in high-stakes environments. She relies on detailed HRI data to understand user needs and improve design continuously.

<table>
<tr><th>Professional goals</th><th>Motivators</th></tr>
<tr><td>To innovate in the field of UX design for robotics, making machines more accessible and intuitive for human workers.
To leverage data from HRI studies to inform design decisions and enhance robot-user interaction.</td><td>A strong belief in the potential of robots to transform industries and improve human work environments.
The desire to make technology accessible and useful for people of all skill levels.
The challenge of translating complex robotic capabilities into simple, intuitive interactions.</td></tr>
<tr><th>Challenges</th><th>Sources of information</th></tr>
<tr><td>Accessing detailed, actionable HRI data to inform design decisions.
Balancing the technical capabilities of robots with the intuitive expectations of human users.
Ensuring safety and productivity through design in diverse industrial environments.</td><td>Industry conferences on robotics and human-computer interaction.
Journals and publications on UX design, robotics, and ergonomics.
User feedback sessions and field studies in industrial settings.</td></tr>
</table>

💡 Expectation

1. Detailed Interaction Visualisation:

- Ability to review video recorded from her company's robots frame by frame, enabling her to observe users' reactions and report on the UX quality of new robots.
- This granular insight is crucial for identifying subtle nuances in human-robot interaction that can significantly impact the user experience.

2. Expert Annotation Capabilities:

- Facility to annotate different moments of the video and audio using expert domain knowledge on UX.
- This includes labelling interactions to feed into future machine learning training, enhancing the robot's behaviour and future user experience.
- The ability to easily categorize and label data for analysis and training purposes is vital for refining robot responsiveness and intuitiveness.

3. Audio Transcript Conversion:

- Access to audio transcripts of interactions, allowing for a detailed analysis of the robot's verbal responses.
- This feature is essential for identifying which replies may be inappropriate or confusing, enabling targeted improvements to robot communication strategies to enhance overall user experience.

User Persona 4

Persona name	**Rahul Sharma**
Persona role	Co-founder and HCI Engineer at AutoTransTech
Job description	Co-founder and HCI Engineer at an innovative startup, AutoTransTech, which develops advanced, completely human-free parcel stations powered by robotics for sorting, transporting, and preparing goods.

🏢 Company

Company name	AutoTransTech Startup
Company size	Small (30 employees)
Industry	Logistics and Robotics in the Automotive Transportation Sector
Company Description	AutoTransTech is an innovative startup transforming the logistics industry through the development of fully autonomous parcel stations. Leveraging advanced robotics and cutting-edge human-computer interaction principles, the company specializes in creating efficient, human-free systems for sorting, transporting, and preparing goods. AutoTransTech is at the forefront of redefining automotive transportation logistics to meet the evolving demands of global commerce and e-commerce growth.

👥 Demographic information

Age	40
Gender	Male
Income	Variable, dependent on startup success and funding rounds
Education level	Bachelor's Degree in Mechanical Engineering, self-taught in programming and business management
Residential environment	Urban, in a tech-centric city area

🖋️ Personal quote

"Revolutionizing logistics with robotics, we're creating seamless, efficient, and entirely autonomous parcel stations."

📜 Biography

Rahul Sharma transitioned from a mechanical engineer to an entrepreneur with a vision for transforming the logistics industry. At AutoTransTech, Rahul leads the development of autonomous parcel stations that utilize sophisticated robotics to handle sorting and transportation tasks without human intervention. This venture represents a bold step into the future of automotive transportation, where efficiency, speed, and reliability are significant. Rahul's deep involvement in HCI ensures that the interactions between the robots are as seamless and efficient as possible, focusing on optimizing the system's overall performance and reliability.

Professional goals	**Motivators**
• To innovate in the logistics industry by introducing fully autonomous parcel stations that redefine efficiency and reliability. • To overcome the challenges of designing highly efficient, cooperative robotic systems for logistics applications. • To leverage technology for creating scalable, future-proof solutions in logistics, meeting the growing demands of e-commerce and global trade.	• A deep desire to make a positive impact in the field of robot automation industry through technology. • The entrepreneurial challenge of building a successful business that delivers value to society. • The technical challenge of developing robots that are both reliable and commercialisable for business.
Challenges	**Sources of information**
• Balancing rapid development and iteration with thorough and insightful analysis of HRI data to inform design decisions. • Limited resources for dedicated data analysis personnel and tools. • Ensuring the robots are reliable for independent workflow and continue add value to business.	• Industry reports and research papers on robotics and automation within logistics. • Feedback and performance data from the robotic systems in operation. • Conferences, workshops, and seminars focused on robotics technology, and human-computer interaction.

💡 Expectation

1. Behavioural Analysis Capability:

- Rahul expects the ability to use the ROSAnnotator to analyze and study the behaviour of the robots in the parcel stations, identifying areas for optimization and enhancement.

2. Synchronized Multi-Robot Data Visualization:

- He requires the functionality to load multiple ROS data streams from different robots into one synchronized dashboard, enabling the visualization of their cooperative efficiency and performance.

3. Custom Annotation Tools:

- The system should allow for the creation of custom labels for annotating ROS data.
- Rahul aims to define his own scales and event types specific to AutoTransTech's operations, facilitating a tailored analysis approach.

4. Batch and Automatic Annotation:

- Given the high volume of data generated by the robots, Rahul needs the capability for batch and automatic annotation of multiple robots' data simultaneously. This feature is crucial for efficient data processing and analysis.

5. Future AI Integration:

- Looking ahead, Rahul plans to integrate AI into AutoTransTech's systems. The ROSAnnotator's ability to support this integration is essential, as it will enable more sophisticated analysis and predictive modelling of robot behaviour and station efficiency.

User Stories

Priority Legend	
MUST HAVE	Essential features that are critical for the software's basic functionality and core objectives.
COULD HAVE	Desirable features that enhance user experience or functionality but are not critical for the initial release.
NICE TO HAVE	Features identified as lowest priority, excluded from the current development cycle but potentially revisited later.

🎯 Objective

Note:

- The table is separated by Epics. Each epic section corresponds to a core functional area in the product requirement.
- The unit for velocity estimation are **story points**, please refer to Velocity Estimation for details.
  - We have only estimated the story points for MUST HAVE prioritise, as they will be performed in earlier sprints.
- For the end users, please refer back to the list of Personas.

Epic ID	User Story ID	As a <User>	I want to <Do Something>	So that <achieve goals>	Velocity Estimation	Priority
ROS & HRI Data Handling Capability						
1	1.1	Dr. Emily Nguyen Alex Rivere Rahul Sharma	efficiently **load and parse** various ROSBag data containing diverse data types, such as video streams, 3D point clouds, and audios	I can efficiently access and analyze the interaction data from the HRI experiments without manual data conversion	6	MUST H...
	1.2	Dr. Emily Nguyen Rahul Sharma	have robust support for parsing and visualizing custom **HRI messages** `hri_msgs`	I can deeply understand robot-child interactions and their impacts on learning	3	MUST H...
		Dr. Emily Nguyen	handle data variabilities in ROSBags, such as **different** message **types** and **formats**	work with data from various sources without needing to preprocess extensively		MUST H...
	1.3	Alex Rivere Rahul Sharma	handle **large volumes** of ROSBag data efficiently, ensuring quick loading and parsing times	quickly find relevant data points for my analysis		NICE TO ...

	1.4	Alex Rivere	**filter and search** within the loaded ROSBags for specific data types or messages	I can quick allocte / lookup a recipe		COULD ...
Synchronised Interactive Dashboard						
2	**2.1**	Dr. Emily Nguyen Rahul Sharma	**visualize 3D point clouds** from ROSBag data within the application	analyze spatial aspects of human-robot interactions in educational settings	5	MUST H...
		Dr. Emily Nguyen	load and play **video streams** from ROSBags with other data types	observe and analyze the dynamics of robot-child interactions in real-time	3	MUST H...
	2.2	Dr. Emily Nguyen Alex Rivere Rahul Sharma	all visualized data streams (video, 3D point clouds, custom HRI messages) to be **synchronized** in **real-time** on the dashboard	observe and analyze how different elements of human-robot interactions interplay simultaneously	5	MUST H...
	2.3	Alex Rivere	**interact** with the dashboard, such as **pausing**, **rewinding**, and **fast-forwarding** through data streams	closely examine specific moments or interactions of interest	3	COULD ...
	2.4	Alex Rivere	**toggle** the **visibility** of different data types on the dashboard	focus on specific aspects of the data without distraction from other information		COULD ...
	2.5	Samira Campbell	review video recordings from industrial robots **frame by frame** within the application	closely observe and analyze users' reactions and interactions with the robots		COULD ...
	2.6	Samira Campbell	**adjust playback speed** and navigate through video recordings easily	focus on critical moments of interaction without missing any details that could inform design improvements		COULD ...
	2.7	Samira Campbell	**zoom** and enhance features on video footage	examine intricate details of user expressions and movements that might indicate usability issues or areas for enhancement		NICE TO ...
	2.8	Rahul Sharma	visualize **spatial relationships** and distribution among robots in a shared space	optimize layout and assignments for increased productivity		NICE TO ...
	2.9	Rahul Sharma	**highlight** and focus on data **for specific data types** or from specific robots or tasks	drill down into detailed analyses of individual performances within the context of the team's overall operation		NICE TO ...
Annotation Features						
	3.1	Dr. Emily Nguyen	**intuitive** and **interactive** interface for annotating video streams and 3D point clouds	precisely mark and note relevant interactions between children and robots without extensive technical training	3	MUST H...

3	3.2	Dr. Emily Nguyen	**synchronize annotations** across different data streams (video, audio transcripts, 3D point clouds)	maintain a cohesive understanding of interactions and events	3	MUST H...
		Dr. Emily Nguyen Alex Rivere	easily **save** and **export** annotated **datasets** in a common format (e.g., ROSBag)	share findings with the academic community, preserve data for future analysis, or integrate insights into my research workflow	3	MUST H...
	3.3	Alex Rivere Rahul Sharma	manually annotate the data with **custom scales** for states and events, such as "robot successfully avoided obstacle"	tailor the analysis to specific research questions and hypotheses		COULD ...
	3.4	Alex Rivere	easily **edit** or **delete** annotations	refine my analysis and keep my data organized and accurate as my understanding evolves	2	COULD ...
	3.5	Samira Campbell	annotate the **transcribed text** with **custom** tags or notes	highlight and categorize important verbal interactions or phrases relevant to my research		NICE TO ...
	3.6	Samira Campbell	annotate video and audio recordings with detailed labels using my domain knowledge, such as "user confusion", "successful interaction", or "navigation issue"	categorize interactions for in-depth analysis and future machine learning model training		NICE TO ...
		Samira Campbell	**track** changes and **updates** to **previous annotations** over time	monitor the evolution of user interaction trends and the impact of future modifications		NICE TO ...
	3.7	Rahul Sharma	flexibility to **modify** and **expand** my **annotation schema** as our understanding of optimal robot behavior evolves	ensuring our analytics capabilities grow with our company		NICE TO ...
	3.8	Rahul Sharma	**store custom annotation** sets within the system	promoting a standardized approach to analyzing and discussing robot performance across our development		NICE TO ...
Integration with Auto-Transcription						
4	4.1	Samira Campbell	automatically **transcribe audio data** from the ROSBags into text transcripts	analyze verbal interactions without the need for manual transcription, saving time and increasing accuracy		COULD ...
	4.2	Samira Campbell	**correlate** transcribed text with **specific moments** and events **in the video and 3D point cloud data**	I can gain insights into the verbal aspects of human-robot interactions		COULD ...
	4.3	Samira Campbell	option to **manually review** and **correct** the auto-transcribed text	ensuring high accuracy and reliability of the data for analysis		NICE TO ...
Multiple ROSBags Loading						

5	5.1	Dr. Emily Nguyen	manage and **switch** between **multiple ROSBags** easily within the application	I can conduct comparative and composite analysis without significant downtime		NICE TO ...
	5.2	Alex Rivere Rahul Sharma	easily **select** and **load multiple ROSBags** into the application	perform comparative analyses across different datasets to identify patterns or discrepancies in HRI data.		COULD ...
	5.3	Rahul Sharma	**compare** different **data** format from different operational scenarios **side by side**	assess how well our robots work together under varying conditions and identify areas for synchronization improvements		NICE TO ...
Automatic Annotation						
6	6.1	Rahul Sharma	**batch annotation** capabilities to efficiently process large volumes of data	allowing for quick categorization and analysis of robot performance across multiple parcel stations		NICE TO ...
	6.2	Rahul Sharma	**automatic annotation** of common events and behaviors detected in ROS data	streamline the initial stages of data analysis and focus on in-depth evaluation of anomalies and optimization opportunities		NICE TO ...
	6.3	Rahul Sharma	**customize rules** for automatic annotation	learn and adapt to our specific operational metrics and goals		NICE TO ...
	6.4	Rahul Sharma	**review and adjust** automatically generated annotations	ensuring accuracy and relevance to our constantly evolving understanding of optimal robot behavior		NICE TO ...
Administration Functionality						

Velocity Estimation

📚 Background

The project team is engaged in an Agile development process, with sprints as the primary time management structure for delivering new features and updates. The team's current velocity—an estimate of the amount of work they can complete in a single sprint—is a critical factor for planning and forecasting future work.

🌟 Outcome

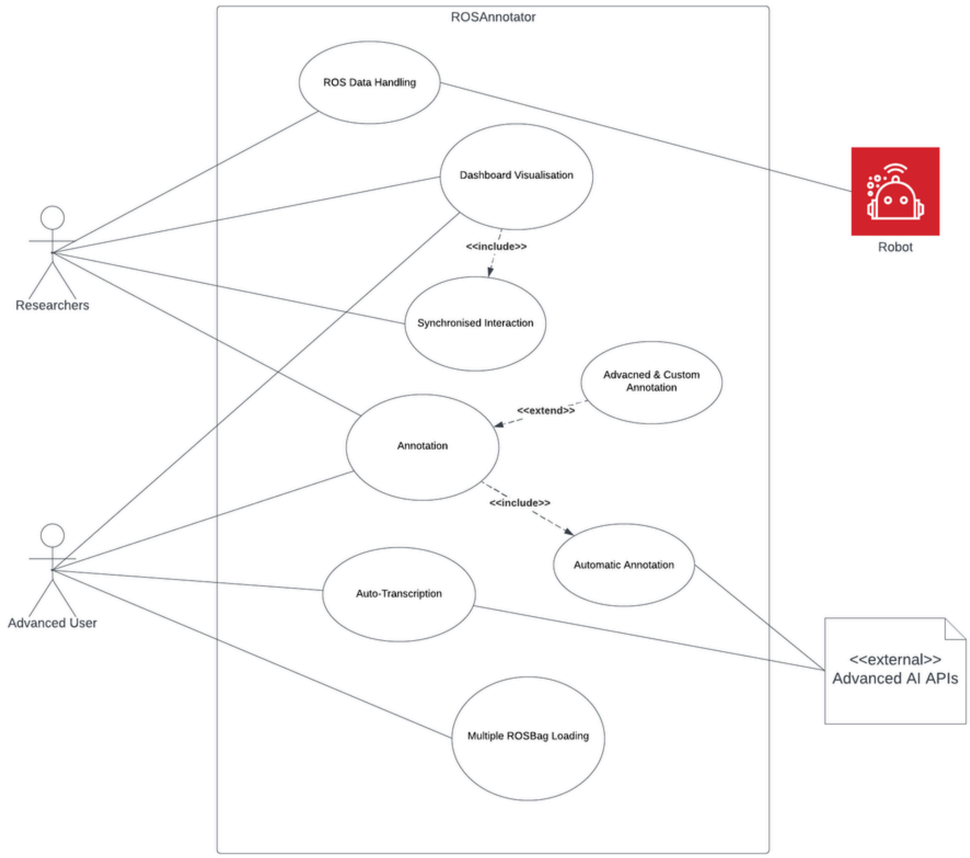
- We estimate each team member can achieve approximately **3 story points per person per sprint.**
- Taking into account a total of 7 team members, we estimate to deliver at the velocity of **21 story points per sprint.**

Use Cases

Main Functional Requirements

Use Case	Step & Flow	Priority
ROS Data Handling	ROS Data Handling	MUST HAVE
Dashboard Visualisation	Dashboard Visualisation	MUST HAVE
Synchronised Interaction	Synchronised Interaction	MUST HAVE
Annotation Features	Annotation Features | 1. Basic Annotation	MUST HAVE
Custom Annotation	Annotation Features | 2. Advanced Customisation and Labeling	COULD HAVE
Automatic Annotation	Annotation Features | 3. Automatic Annotation	NICE TO HAVE
Auto-Transcription	Auto-Transcription	COULD HAVE
Multiple ROSBags Loading	Multiple ROSBags Loading	COULD HAVE

UseCase Diagram



Note:

- The two primary actors only represent different groups of users, rather than corresponding to specific roles.

ROS Data Handling

Title: Efficient ROSBag Data Loading and Parsing

Actors: Dr. Emily Nguyen, Alex Rivere, Rahul Sharma

Preconditions: ROSBag data is available and accessible by the application.

Main Flow:

1. The user selects the ROSBag file they wish to load into the application.
2. The application parses the ROSBag data, recognizing and notifying the user of various data types (e.g., video streams, 3D point clouds, audio).
3. The application efficiently loads the data onto the dashboard without any errors, making it readily accessible for analysis.
4. The user accesses and analyzes the HRI data, focusing on interactions without needing manual data conversion.

Postconditions: The user has successfully loaded and parsed ROSBag data, ready for in-depth analysis.

Dashboard Visualisation

Title: Visualizing 3D Point Clouds and Video Streams

Actors: Dr. Emily Nguyen, Rahul Sharma

Preconditions: 3D point cloud and video stream data are loaded into the system

Main Flow:

1. The user selects the ROSBag file containing 3D point cloud and video stream data ready for display.
2. The application loads and displays the 3D point cloud and video streams on the dashboard in a way that the user can interact with the data.
3. The user analyzes spatial aspects and dynamics of human-robot interactions by observing the synchronized data.
4. The user can click on each section of the window to change focus and drag the video or 3D objects to change the viewpoints.

Postconditions:

- All data has been displayed aligned to the same time points, the dashboard interface is intuitive and easy to navigate.
- The user has visualized and analyzed the 3D spatial and video data in synchronization.

Synchronised Interaction

Title: Interacting with the Synchronized Dashboard

Actors: Alex Rivere

Preconditions: Multiple data streams of different types are visualized on the dashboard.

Main Flow:

1. The user views synchronized data streams (video, 3D point clouds) on the dashboard.
2. The user interacts with the dashboard, using controls to pause, rewind, or fast-forward through the video data. Meanwhile, all other data streams (including 3D objects and audio) change correspond to the synchronised timeline.
3. The user focuses on specific moments or interactions of interest for closer examination.

Postconditions: The user has interactively examined specific data points across synchronized data streams.

Annotation Features

1. Basic Annotation

Title: Annotating Video Streams and 3D Point Clouds for State and Event

Actors: Dr. Emily Nguyen

Preconditions: Video and 3D point cloud data are loaded onto the dashboard and in a state ready to be modified.

Main Flow:

1. The user selects a segment of the video or a section of the 3D point cloud for **event** annotation. The application highlights the selected parts and prompts for actions.
2. The user chooses the annotation options, optionally adds in text, and inserts an annotation for the highlighted selection, noting relevant interactions or features.
3. The application shows the message of annotated success or failure.
4. Annotations are synchronized across different data streams for cohesive analysis.
5. The user clicks “save” to save or download the annotated data for future reference or sharing.
6. The system pops up the loading window and prompts for successful download.

Alternative Flow:

1. * The user selects a particular frame of the video or one timepoint of the 3D point cloud for **status** annotation. The application highlights the selected parts and prompts for actions.

Postconditions:

- The user has annotated and synchronized notes across multiple data types.
- The newly labelled data has been downloaded in the ROSBag format for future use.

2. Advanced Customisation and Labelling

Title: Customizing Annotated Datasets

Actors: Alex Rivere, Rahul Sharma

Preconditions: Video and 3D point cloud data are loaded onto the dashboard and in a state ready to be modified.

Main Flow:

1. Refer to Basic Annotation Steps 1 & 2.
2. The user selects the option to customise an annotation with self-defined scales or specific state names or events.
3. (Optional) The application prompts the user to save the self-defined label into the system.
4. The user chooses a labelled timepoint and easily edits or deletes annotations to refine their analysis.
5. The annotated dataset is saved in a common format, like ROSBag, for future loading or analysis.
6. The user shares the annotated dataset with the academic community or team members.

Postconditions: Customized annotations have been added and saved for further analysis or integration into research workflows.

3. Automatic Annotation

Title: Annotating Video Streams and 3D Point Clouds for State and Event

Actors: Dr. Emily Nguyen

Preconditions: Video and 3D point cloud data are loaded onto the dashboard and in a state ready to be modified.

Main Flow:

1. The user selects a segment of the video or a section of the 3D point cloud. The application highlights the selected parts and prompts for actions.
2. The user selects the “Automatic Annotation“ option on the toolbar in the application.
3. The system pops up the loading window to inform the user the application is conducting AI analysis on the selected portion.
4. The application displays and highlights all the newly labelled time points and indicates the automatic annotation has finished.
5. The user can select one or more annotations to refine the labelling. Actions include editing, deleting and adding new annotations.
6. Refer to Basic Annotation Steps 4 - 6.

Postconditions:

- The user has annotated and synchronized notes across multiple data types.
- The newly labelled data has been downloaded in the ROSBag format for future use.

Auto-Transcription

Title: Transcribing Audio Data from ROSBags

Actors: Samira Campbell

Preconditions: ROSBag with audio data is loaded into the application.

Main Flow:

1. The user selects the ROSBag file containing audio data for transcription.
2. The application displays the data as an audio waveform in the dashboard.
3. The user selects the “Auto-transcription“ button on the toolbar.
4. The application pops up the loading window and prompts the user that “AI is Calculating”.
5. The system automatically transcribes the audio data into text transcripts and displays the transcript in an independent window for further actions.
6. The user can review and, if necessary, correct the auto-transcribed text for accuracy. The user clicks the “Confirm” button to insert the audio transcript.
7. The transcribed text is correlated with video and 3D point cloud data in the synchronised timelines for comprehensive analysis, enhancing the user's analysis capabilities.

Postconditions:

- Verbal interactions from the ROSBag are transcribed and displayed on the dashboard.
- The data is aligned with other data types on the dashboard for future annotations.

Multiple ROSBags Loading

Title: Managing and Analyzing Multiple ROSBags

Actors: Dr. Emily Nguyen, Alex Rivere, Rahul Sharma

Preconditions: Multiple ROSBags are available for analysis.

Main Flow:

1. The user selects multiple ROSBags for loading into the application.
2. The application efficiently loads the selected ROSBags, ready for analysis.
3. The user selects one displaying option from various view options, including side-by-side, synchronised, controlled variables, and so on.
4. The user performs comparative analysis across the different datasets, identifying patterns or discrepancies.
5. The user performs annotations on multiple datasets. Refer to Auto-Transcription
6. Insights from the comparative analysis inform further research or operational improvements.

Postconditions: The user has successfully managed and analyzed multiple ROSBags, gaining valuable insights for research or operational enhancements.

💻 Development

GitHub Link:

COMP90082-2024-SM1

COMP90082-2024-SM1 has one repository available. Follow their code on GitHub.

GitHub

Development Environment

This document outlines the development environment setup for our project, which utilizes Node.js and React for frontend development, and Python with Django for the backend. This guide is intended to help new contributors get their development environment up and running smoothly.

Frontend Development

Node.js and React

Our frontend application is built using React, a popular JavaScript library for building user interfaces, particularly single-page applications. Node.js is used for running JavaScript code server-side, and npm (Node Package Manager) is used to manage project dependencies.

Prerequisites:

- **Node.js**: Ensure you have the latest LTS (Long-Term Support) version of Node.js installed, which includes npm.

Backend Development

Python and Django

The backend of our project is built using Django, a high-level Python web framework that encourages rapid development and clean, pragmatic design. Python is the programming language used.

Prerequisites:

- **Python**: Ensure you have Python 3.12.2 installed on your system.
- **pip**: The Python package installer, which usually comes with Python.

API Documentation

Deployments

🚀 Sprint Management

Sprint Tasks (Trello Board)

Sprint Goals

Your browser was unable to load all of Trello's resources. They may have been blocked by your firewall, proxy or browser configuration.
Press Ctrl+F5 or Ctrl+Shift+R to have your browser try again and if that doesn't work, check out our troubleshooting guide .

Sign up to see this board

You're almost there! The board you are trying to access requires a Trello account.

Sign up for free

Already have an account? Log in

Sprint 1 Deliverables

Sprint 1

TW Owned by Tianqi Wang • Updated 20 hours ago

Sprint 1 check-list https://comp90082-2024-na-koala.atlassian.net/wiki/spaces/comp900822/pages/3014657 Sprint 1 task distribution https://comp90082-2024-na-koala.atlassian.net/wiki/spaces/comp900822/pages/6324238 Sprint 1 Retrospective Summary https://comp90082-2024-na-koala.atlassian.net/wiki/spaces/comp900822/pages/6160408

Confluence

Open preview

Sprint 1

Sprint 1 check-list

Sprint 1 check-list

TW Owned by Tianqi Wang • Updated 21 hours ago

Sprint 1 (checklist) This checklist helps you double-check your work for Sprint 1. ## Background description, client goals, motivation [✔️] Project overview, background and goals were created. (not mandatory but recommended for all projects - these resources would help with the design sprint and project overview) [✔️] DO-BE-FEEL list and GOAL

Confluence

Open preview

Sprint 1 task distribution

Sprint 1 task distribution

TW Owned by Tianqi Wang • Updated 3 days ago

User stories, use cases, Personas. @Harry Wang Confluence: @yuchsong2 @yucpeng1 meeting notes Sprint planning/retrospective Daily Standups Project overview, project goal, DO-BE-FEEL list, goal model @Tianqi Wang GitHub structure and Readme. @Bowen Fan Trello board. @Yujie Zheng

Confluence

Open preview

Sprint 1 Retrospective Summary

Sprint 1 Retrospective Summary

Y Owned by yuchsong2 • Updated 3 days ago

@Tianqi Wang @Yujie Zheng @Bowen Fan @Harry Wang @yuchsong2 @yucpeng1 @Jinhao He Sprint Number : 1 Duration : 4 March 2024 - 22 March 2024 What went well? Teamwork : Collaboration and support among team members facilitates the smooth running of the work. Task completion was good : the sprint completed all planned tasks and team members performed we

Confluence

Open preview

Sprint 1 check-list

Sprint 1 (checklist)

This checklist helps you double-check your work for Sprint 1.

Background description, client goals, motivation

- [✅] Project overview, background and goals were created.

(<u>*not mandatory*</u> *but recommended for all projects - these resources would help with the design sprint and project overview*)

- [✅] DO-BE-FEEL list and GOAL MODEL were created.
- [✅] The goal model is consistent with the client understanding of the problem and with DO-BE-FEEL list.
- [✅] Personas are based on the research done by students and the discussion with industry partners.
- [✅] Personas are inclusive and diverse.

Analysis of requirements (User Stories or Use Cases)

- [✅] The analysis of requirements was performed on most of the existing requirements.
- [✅] The [new set of] requirements is consistent to the scope of the project, completely cover the new capabilities required by the client and are well documented/structured/organised on Confluence.
- [✅] The requirements can be documented in the form of user stories or use cases, supplementary specification of design/implementation/deployment requirements, prototypes, and others. It may also be necessary to be explicit about what is not in scope to define the scope boundary more clearly.
- [✅] We used ChatGPT to generate user stories to our project. On Confluence Space, we documented the prompt we've used, what user stories were generated WITH and WITHOUT ChatGPT.

Development environment

- [✅] Confluence is organised (cover page, project details, requirements, technical details about the project, meeting minutes and so on).
- [✅] Trello (or Github projects or JIRA) is created, structured and organized.
- [✅] Previous/existing project is deployed and could be used/tested as part of this requirements engineering phase.
- [✅] README file is updated and provide details about the project, workflow (branches/naming conventions and so on).

Plan

- [✅] A plan (or discussion on what to do next) was provided (requirements to develop, technologies to use, infrastructure to deploy the project) for Sprint 2 and Sprint 3.
- [✅] Requirements were estimated and prioritised.
- [✅] Backlog items can be found in Trello (or Github project or JIRA).

Meetings

- [✅] Meetings are recorded in Confluence and only. They were NOT exported to Github as they're part of internal process.

GitHub

- [✅] Folders are structured (On Canvas, visit Assignment -> "Sprint 1: Confluence Space, project background and elicitation documents" page: you can find requirements for folders' structure.)

- [✅] Sprint 1 documents were exported from Confluence and added to the repository (and are updated)
- [✅] README file is updated and explain the team's repository
- [✅] A baseline tag was generated for this Sprint (On Canvas, visit Assignment -> "Sprint 1: Confluence Space, project background and elicitation documents" page: you can find requirements for the baseline tag)

Additional Information

do you have any other additional information you'd like to share with us? Please add it here.

Sprint 1 task distribution

1. User stories, use cases, Personas. @Harry Wang
2. Confluence: @yuchsong2 @yucpeng1
   a. meeting notes
   b. Sprint planning/retrospective
   c. Daily Standups
3. Project overview, project goal, DO-BE-FEEL list, goal model @Tianqi Wang
4. GitHub structure and Readme. @Bowen Fan
5. Trello board. @Yujie Zheng

Sprint 1 Retrospective Summary

- @Tianqi Wang
- @Yujie Zheng
- @Bowen Fan
- @Harry Wang
- @yuchsong2
- @yucpeng1
- @Jinhao He

Sprint Number: 1

Duration: 4 March 2024 - 22 March 2024

What went well?

- **Teamwork**: Collaboration and support among team members facilitates the smooth running of the work.
- **Task completion was good**: the sprint completed all planned tasks and team members performed well on the tasks.
- **Active participation in the discussion**: the group members were actively involved in the discussion, presenting different points of view and discussing them.
- **Efficient completion of tasks**: everyone completed their part of the task efficiently.

Areas for improvement

- **Scheduling of meetings**: Meetings were not scheduled appropriately and there were occasional absences.

action plan

Adjust Meeting Times: Re-evaluate and adjust the scheduling of team meetings to reduce absences, and emphasize the meeting time in Slack to ensure that all team members receive the notification.

Summary

The team excelled in communication, task completion and quality control in this sprint. The active participation of members and efficient execution were key to this success. However, the meeting schedule needs to be improved to ensure that all members can attend. In the next sprint, we will adjust the meeting times to better accommodate team members' schedules.

Sprint 2

Sprint 2 Planning: Development

Objective: Implementation phase - Develop the front-end, back-end, and integrate meta features.

Duration: 4 weeks

Tasks:

1. **Requirement Analysis and Planning**
    - Survey existing annotation tools and identify potential features and technologies for integration.
    - Gather detailed requirements and specifications by conducting meetings with PhD students in the research group.
    - Do a low-fidelity (or optionally high-fidelity) prototyping, and conduct a meeting with the client and PhD students to verify the ideas.
    - Duration: 1 week
2. **System Design**
    - Architect the web application, focusing on modularity, scalability, and user experience.
    - Design the data model to handle various data types and annotations efficiently.
    - Duration: 1 week
3. **Front-end Development**
    - Implement the web-app with interactive dashboard and visualization tools.
    - Duration: 2 weeks
4. **Back-end Development**
    - Develop the backend with capability to parse and manage ROSBag data of common data types, like video streams.
    - Duration: 2 weeks
5. **Setup the Virtual Machine for the ROS development environment**

Sprint 3

Sprint 3 Planning: Development

Objective: Focus on refinement, and addressing any identified issues or improvements.

Duration: 4 weeks

1. **Integration with Auto-Transcription**
   - Integrate auto-transcription service for audio to text conversion.
   - Develop annotation functionalities.
   - Duration: 1 Week
2. **Annotation Features**
   - Develop custom scales and annotation tools for users.
   - Duration: 2 Week
3. **Automatic Annotation Exploration**
   - Research and prototype automatic annotation methods.
   - Duration: 1 Week
4. **Front-End Refinement**
   - Gather feedback on the front-end design from users or stakeholders.
   - Implement improvements and refinements to enhance user experience and usability.
   - Duration: Throughout Sprint 3
5. **Testing**
   - Conduct thorough testing, including unit tests, integration tests, and user acceptance tests.
   - Address any issues or bugs identified during testing.
   - Duration: 1 Week