Data Science Project Proposal

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Domain:

Data Science in Himalayan Mountaineering

Topic:

Application of data science in improving the summit success rate of Himalayas: analysing key factors for climbers' success

This project is proposed based on The Himalayan Database (Salisbury, 2017).

Project Description

With the popularity of mountain climbing in the Himalayan region, especially in Nepal, it has become particularly important to understand and optimise mountaineering strategies. In addition, the natural risks and challenges associated with the extreme sport of mountaineering have placed a higher demand on the safety awareness of climbers. The aim of this project is to comprehensively analyse historical data through statistical analysis and machine learning methods in order to observe the key factors affecting summit success and mountaineering's safety. Through this project, we aim to provide climbers with precise training and preparation recommendations to maximise success rates and significantly reduce the risk. We expect that this project will contribute

valuable knowledge and resources to the mountaineering community in the Himalayan region and globally.

Project Objectives

- Utilise data science methods to identify and quantify the key factors that influence summit success, and based on this, provide climbers with targeted training and preparation advice.
- Raise climbers' awareness of potential risks and suggest effective strategies to reduce the risk of injury or death.

Data Science Roles and Responsibilities

1. Project Manager:

   Responsible for project planning, team collaboration, resource and budget management, and communication with all stakeholders, etc.

2. Business Analyst:

   Collect needs and expectations through communication with climbers, mountaineering companies, and other stakeholders. Ensure effective communication between the data science team and non-technical stakeholders.

3. Record Collector:

   Responsible for interviewing climbers and teams, verifying and recording information, and ensuring data quality and usability (Salisbury, 2017).

4. Data Entry Clerk:

Transcribe handwritten notes and paper data into the Himalayan database to ensure data is electronic and accurate (Salisbury, 2017).

5. System Architect:

   Design the overall technical architecture of the project, including the process of data storage, processing, analysis and results presentation, to ensure the scalability, security, performance and stability of the system.

6. Data Engineer:

   Implement the system architect's design scheme, including the establishment of data processing process and management database, to ensure the effective storage and query of data.

7. Data Analyst:

   Conduct exploratory data analysis to identify patterns, trends and outliers in data through statistical methods and visualisation tools. Generate reports to present analysis results to the team and stakeholders.

8. Data Scientist:

   Conduct in-depth analyses of data using statistical analysis and machine learning techniques to identify factors affecting summit success and develop predictive models to provide recommendations.

Business Modelling

The results of this project may have potential or direct impact on the following areas:

- Mountaineering expeditions in the Himalayan region

- Mountaineering equipment development
- Academic research on high altitude activities
- Insurance product design, etc.

Values and Stakeholders

1. Climbers / Climbing Teams:

   Obtain customised advice on mountaineering strategies and preparation based on individual abilities and goals, and enhance safety awareness and ability to handle risks.

2. Mountaineering Companies / Outdoor Clubs:

   Utilise the project results to enhance customer satisfaction and loyalty by optimising their climbing experience and ensuring safety. Adjust and recommend routes based on success rates and safety data to provide more competitive services.

3. Mountaineering Schools / Training Camps:

   Adjust the teaching content and training intensity according to the critical success factors to improve the ability of the trainees. Enhance the knowledge of potential dangers and improve the safety awareness and self-rescue ability of the trainees.

4. Tourism Industry:

   Based on the summit success rate and safety record of mountaineering activities, promote destination marketing and attract more tourists.

5. Government and Local Management Institutions:

Use the project results to plan more effective mountaineering management and rescue operations to enhance public safety.

6. Research Organisations and Academia:

   Obtain valuable data resources on high-altitude activities, physiological adaptations and environmental impacts, and promote research in related fields.

7. Equipment Manufacturers:

   Develop and improve mountaineering equipment based on the influencing factors of summit success and safety to enhance product quality and market competitiveness.

8. Insurance Companies:

   Evaluate the risk of mountaineering activities more accurately and provide more reasonable insurance products.

Project Challenges

1. Missing and Inaccurate Data:

   Missing data due to age or withholding of information by climbers; wrong information due to errors of judgement by climbers in extreme environments; requirements of special data processing methods.

2. Technical Challenges:

   Advanced technical knowledge or experience may be required by designing and implementing complex data processing processes and constructing, interpreting

accurate predictive models; Selecting appropriate models and tuning parameters to improve prediction accuracy.

3. Complexity of Terminology and Literature in the Field of Mountaineering:

   Additional knowledge in specific area of expertise is needed to better understand and analyse the data.

4. Stakeholder Resistance:

   There may be very few mountaineering companies who wish to benefit from the failure of climbers or even their injury or death. Possible resistance from these companies needs to be addressed.

Influence Diagram

This is an abbreviated version of the influence diagram that explains this project.

We hope this helps you understand the proposal.

References

Salisbury, R. (2017). Team members. The Himalayan Database. Retrieved March 26, 2024, from https://www.himalayandatabase.com/team.html

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