



**Kaunas
Faculty**

ABSTRACT BOOK

**20th Prof Vladas Gronskas
International Scientific Conference**

**8th of May 2026
Kaunas, Lithuania**

20th Prof Vldas Gronskas International Scientific Conference

Abstract Book

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Annotation

The “20th Prof. Vladas Gronskas International Scientific Conference” conference is an arena for cooperation and scholarly fellowship with young researchers and bachelor, master, and doctoral students from Lithuania and foreign countries. It is an arena for open discussion where young researchers can present and share their scientific insights. This conference encourages internationalization and closer cooperation between science and business. The conference keynote speakers – business representatives – provide participants with new insights and inspiration for further research. The main goal of this scientific gathering is to contribute to a reliable, safe, effective, and sustainable economy and business development. Encouraging entrepreneurship is a crucial condition for economic growth, and this puts forward a new approach to business, creativity, value creation, and innovation. It is precisely in this context that business and science should interact.

Key words: international conference, entrepreneurship, economy and business development

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ANALYSIS OF LITHUANIAN BLOOD DONOR DATA USING BIGQUERY

The study is based on analysis of over 1.4 million records of Blood Donor Register, collected by Hygiene Institute in Lithuania, and accessed from EU open data portal. The research aims to identify trends and characterize types of blood donation applying SQL-based analytics by developing machine learning models in Google BigQuery cloud environment. The exploratory data analysis revealed variability in donor health characteristics, differences in hemoglobin levels and donation behavior. K-means clustering enabled to identify four distinct donor groups, and their features for targeted donor segmentation and recruitment strategies. A logistic regression model was developed to predict the donation type (paid vs unpaid), however it showed moderate performance (ROC/AUC ≈ 0.618), class imbalance of data source resulting in favouring the majority class, and high prediction error rate. The machine learning models provided useful insights into donor behavior, their segmentation, and impact.

Key words: *blood donation, machine learning, BigQuery, clustering, healthcare data*

ANALYSIS OF LITHUANIAN BLOOD DONOR DATA USING BIGQUERY



Problem and Objective

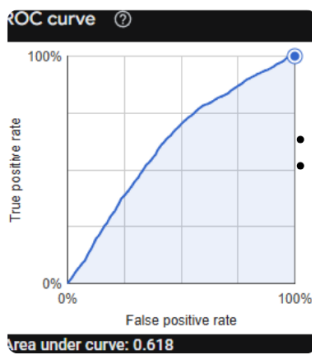
Hundreds of thousands of donations are performed annually in Lithuania. Efficient use of data enables monitoring of activity and improving planning.

- Forecast blood demand
- Analyze seasonal and geographical trends
- Optimize donor recruitment

The dataset contains individual blood donation records with variables describing donor identity, visit details, donation type, location, conditions, and hemoglobin levels, enabling analysis of donor behavior and health patterns.

Methods and Tasks

- Data preparation and analysis in the BigQuery environment
- SQL + machine learning on a single platform
- Logistic regression for donor classification
- K-means clustering based on hemoglobin levels
- Model evaluation (ROC, precision-recall)



Row	target	kiekis
1	0	144773
2	1	32923

1 → compensated donation
 0 → unpaid donation

Row	expected_label	_0	_1
1	0	64538	80235
2	1	8186	24737

Confusion Matrix

Results Interpretation

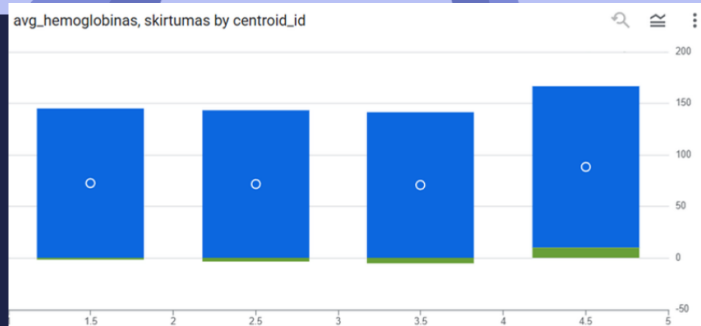
AUC 0.618 - the model distinguishes classes better than random, but overall accuracy is moderate

The dataset is imbalanced, with significantly more class 0 cases than class 1, which causes the model to favor predicting class 0.

The confusion matrix shows that the model can identify some class 1 cases, but still makes a considerable number of errors, including false positives and false negatives.

K-means Insights and Opportunities

- Donors are divided into distinct groups with different hemoglobin levels, which shows that donors are not homogeneous and can be segmented
- Cluster 4 stands out with the highest values, which may indicate a group of physically stronger and more suitable donors
- Clustering helps better understand donor behavior, which supports more targeted and effective recruitment strategies



Information sources

- BigQuery
- https://get.data.gov.lt/datasets/gov/hi/kraujo_donacijos/SekmingaDonoryste

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