

EduVida: Exploratory sensing data analytics for a healthy education life

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1. Work-in-progress

Introduction In recent years, ubiquitous devices have penetrated people's lives, and numerous studies have been conducted to find behavioral and emotional patterns affecting health and well-being [1],[2]. Especially in mental healthcare, till now, the tracking of the patient's conditions relied solely on doctor appointments and self-reported surveys, which are time-consuming and might lack objectivity. During their university years, students often suffer from accumulated stress. Thus, early diagnoses and improved monitoring are becoming vital. Exploiting the StudentLife dataset [3], a structured approach to predict the self-reported PANAS [4] Negative Affect (NA), consult students and reduce university drop-outs is briefly introduced.

Data Sources The StudentLife sensing app captured the daily impact of assignments on the activity, mood, sociability, well-being, and academic performance of 48 students throughout the semester. The StudentLife dataset contains sensor data, Ecological Momentary Assessment (EMA) [5], survey responses, and educational data. The first results show significant correlations between smartphone objective sensor data and the student body's mental health and academic profiles. The PANAS questionnaire is a frequently used instrument assessing positive and negative affect and, in our work, serves as the ground truth.

In this work, we explore the data types presented in Table 1 and investigate if we can predict NA from the objective sensing data. Additionally, there are data depicting academic performance, reporting the Grade Point Averages (GPAs), and the usage of the student forum called Piazza.

Table 1.

The sensing data objectively track the everyday behaviors. The data related to the academic performance capture the educational profiles. The PANAS NA serves as our ground truth.

Sensing Data				Academic Performance		Self-Reported Data
Activity	Sociability	Sleep	Location	GPAs	Piazza	PANAS NA
stationary	calls / sms	dark	bluetooth	gpa all	days online	
walking	voice	silence	wifi	gpa 13s	views	
running	noise		dinning place	gpa cs 65	contributions	
	cnversation				questions	
	phonecharge				notes	
	phonelock				answers	

Discussion The analysis starts with integrating and preprocessing all data types. So far, we have evaluated the performance of state-of-the-art Machine Learning (ML) approaches. Fig. 1 presents the Pearson correlation coefficients between the features (on the left) and the ML models' performance (on the right). The preliminary results of this study show a significant positive correlation between the student's grades and their negative feelings. Moreover, the

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Random Forest (RF) regressor best predicts PANAS NA. We plan to move to a Deep Learning Architecture as a next step. Additionally, we intend to study specific social groups separately, e.g., males and females, first- and second-gen university students, capturing personalized contexts of college students.

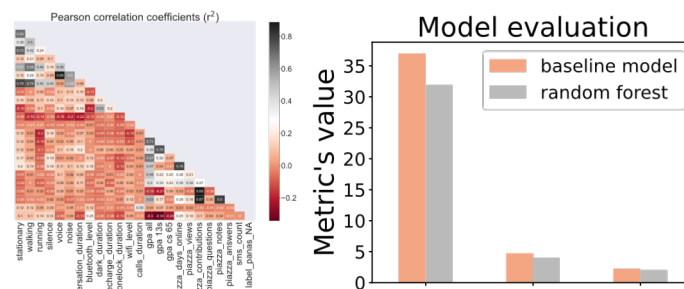


Figure 1. The correlation matrix (on the left) depicts that the PANAS NA is positively correlated with GPA, meaning the lower the student's GPA, the less happy they feel. The preliminary results from the RF regressor compared to the dummy classifier (baseline model) are shown on the right.

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