Brunel University London

Identification of Student "Types" from Online Self-Assessment Temporal Trajectories With Dynamic Time Warping for Performance Prediction

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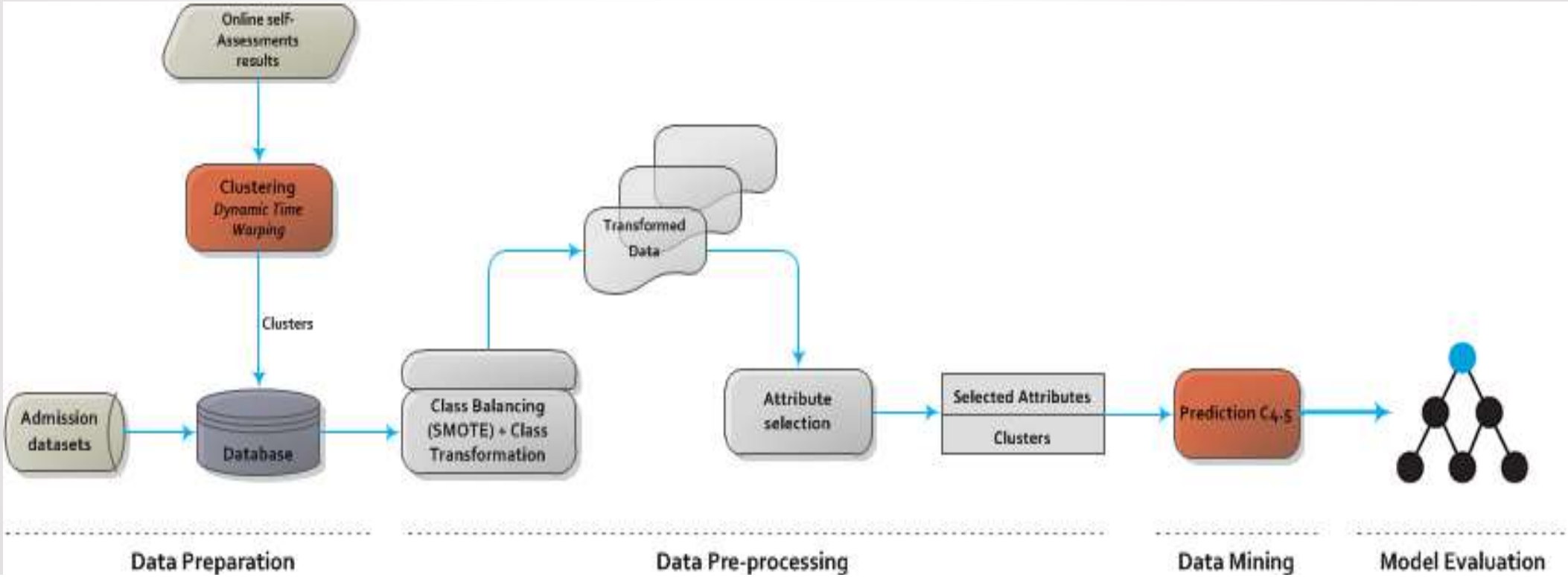
Data and Model

1. **Blackboard Learn:** 329 student records for the temporal online self-assessment Brunel University London (23 self-assessment attributes) attempts of a Logic and Computation Module (code. CS1005) in the 2013/14 and 2014/15 academic years.
2. **Brunel University Admissions:** included student application data when they registered at the University. This includes data such as student demographics, previous educational institution, and parent education level.



Solution

Fig 2. The Distribution of Students' Self-assessment Trajectories into Five Clusters

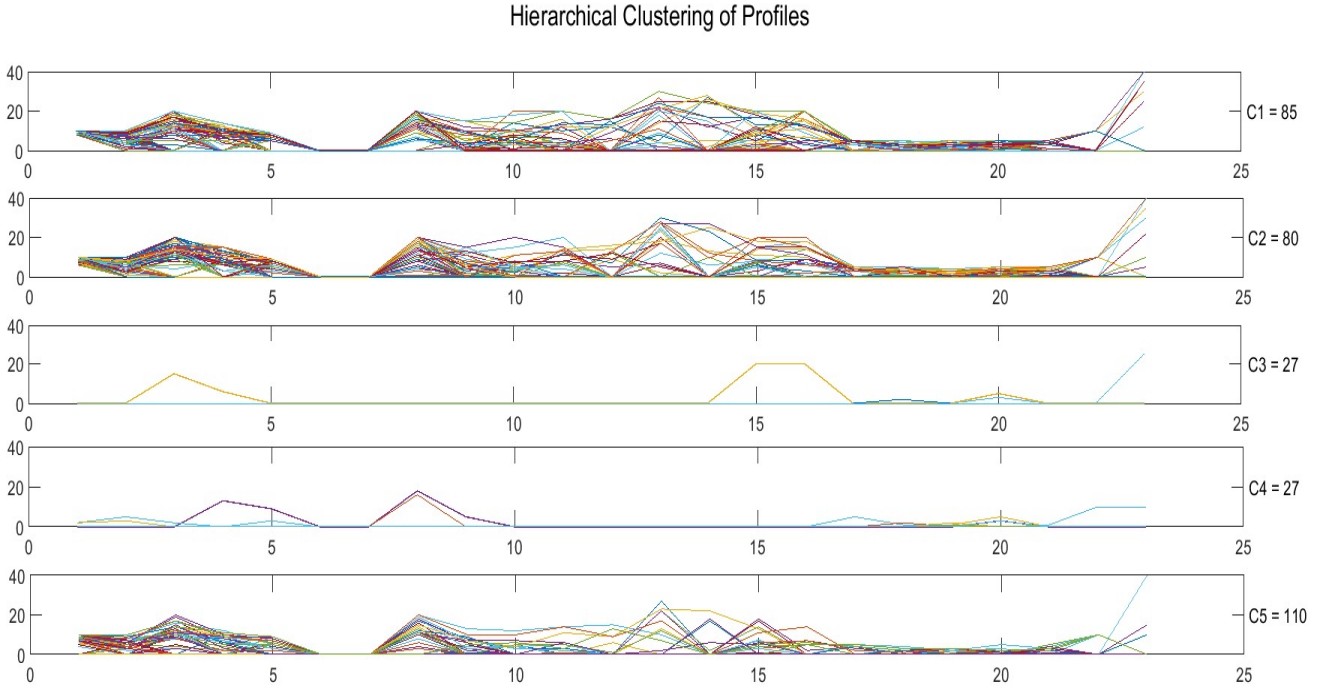
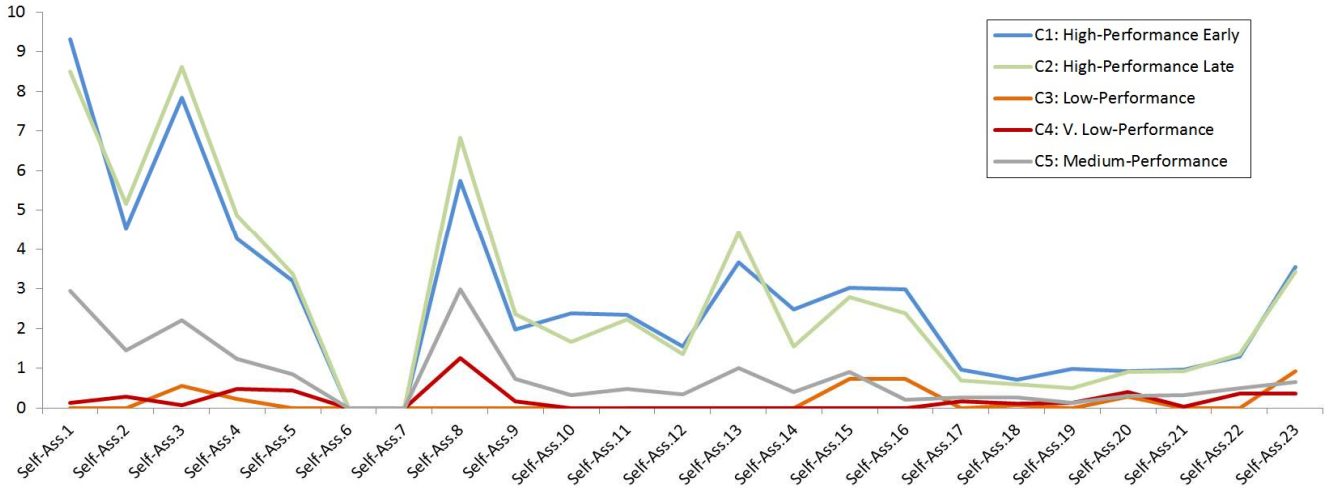
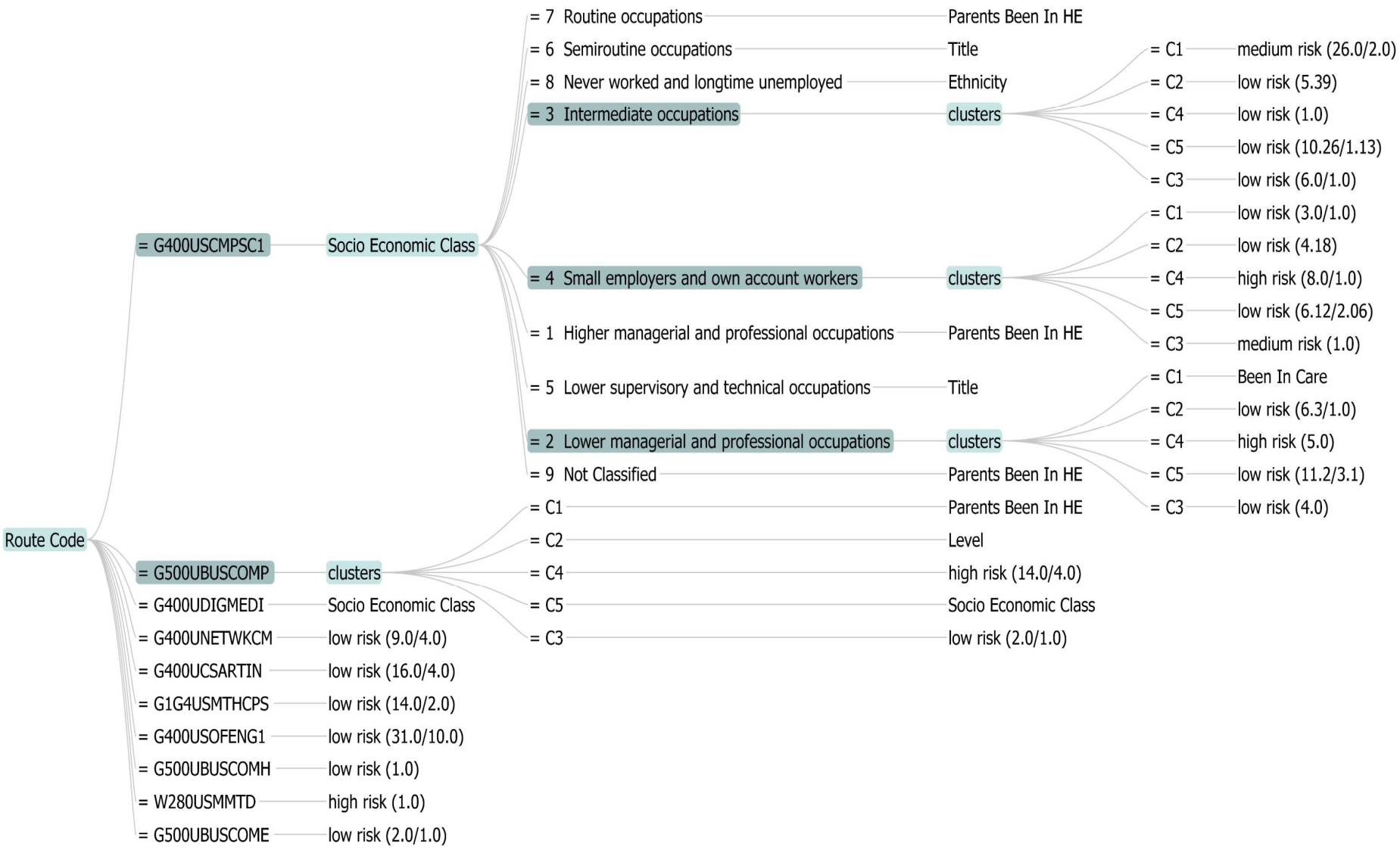


Fig 3. Mean of Student's Grades of the Online Self-assessments per Cluster




Route Code
= G400USCMPSC1
Socio Economic Class
= 7 Routine occupations
Parents Been In HE
= 6 Semiroutine occupations
Title
= 8 Never worked and longtime unemployed
Ethnicity
= 3 Intermediate occupations
clusters
= C1
medium risk (26.0/2.0)
= C2
low risk (5.39)
= C4
low risk (1.0)
= C5
low risk (10.26/1.13)
= C3
low risk (6.0/1.0)
= 4 Small employers and own account workers
clusters
= C1
low risk (3.0/1.0)
= C2
low risk (4.18)
= C4
high risk (8.0/1.0)
= C5
low risk (6.12/2.06)
= C3
medium risk (1.0)
= 1 Higher managerial and professional occupations
Parents Been In HE
= 5 Lower supervisory and technical occupations
Title
= 2 Lower managerial and professional occupations
clusters
= C1
Been In Care
= C2
low risk (6.3/1.0)
= C4
high risk (5.0)
= C5
low risk (11.2/3.1)
= C3
low risk (4.0)
= 9 Not Classified
Parents Been In HE
= G500UBUSCOMP
clusters
= C1
Parents Been In HE
= C2
Level
= C4
high risk (14.0/4.0)
= C5
Socio Economic Class
= C3
low risk (2.0/1.0)
= G400UDIGMEDI
Socio Economic Class
= G400UNETWKCM
low risk (9.0/4.0)
= G400UCSARTIN
low risk (16.0/4.0)
= G1G4USMTHCPS
low risk (14.0/2.0)
= G400USOFENG1
low risk (31.0/10.0)
= G500UBUSCOMH
low risk (1.0)
= W280USMMTD
high risk (1.0)
= G500UBUSCOME
low risk (2.0/1.0)

Results

Table. Detailed Accuracy of the Predictive Model by Class

Approach	Accuracy	Class Attribute (CS1005 Grade)	C4.5 Decision Tree	
			TP Rate	FP Rate
Student Attributes only	71.31 %	low risk	0.56	0.14
		medium risk	0.76	0.20
		high risk	0.83	0.08
Student Attributes + DTW Clusters	**75.52 %**	**low risk**	***0.66**	0.14
		medium risk	***0.74**	0.14
		high risk	***0.88**	0.07

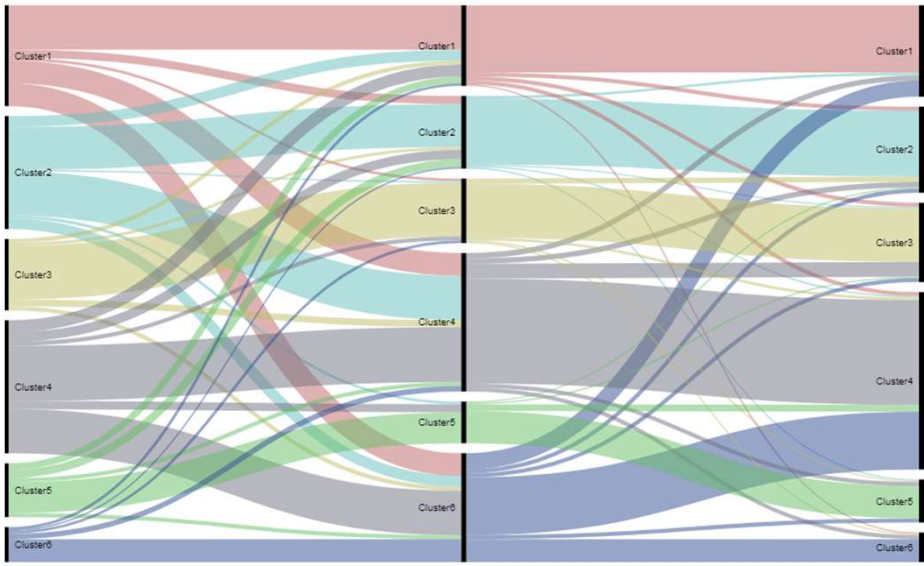


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Fig5. Cognitive Styles of Students based on their Engagement Trajectories and Overall Performance

Thank you!

Happy to discuss more,
Please come and see me at the poster.