

Team 4: Joana, Kevin, Gala

Final Presentation

# SENTIMENT ANALYSIS

Bayer Leverkusen Players' sentiment trends extracted from online News



# Motivation



### SENTIMENT

- Fan attraction
- Sponsor attraction
- Motivation for player & team
- Inform talent scouting process



- Counteract bad sentiment
- Support players with high media attention

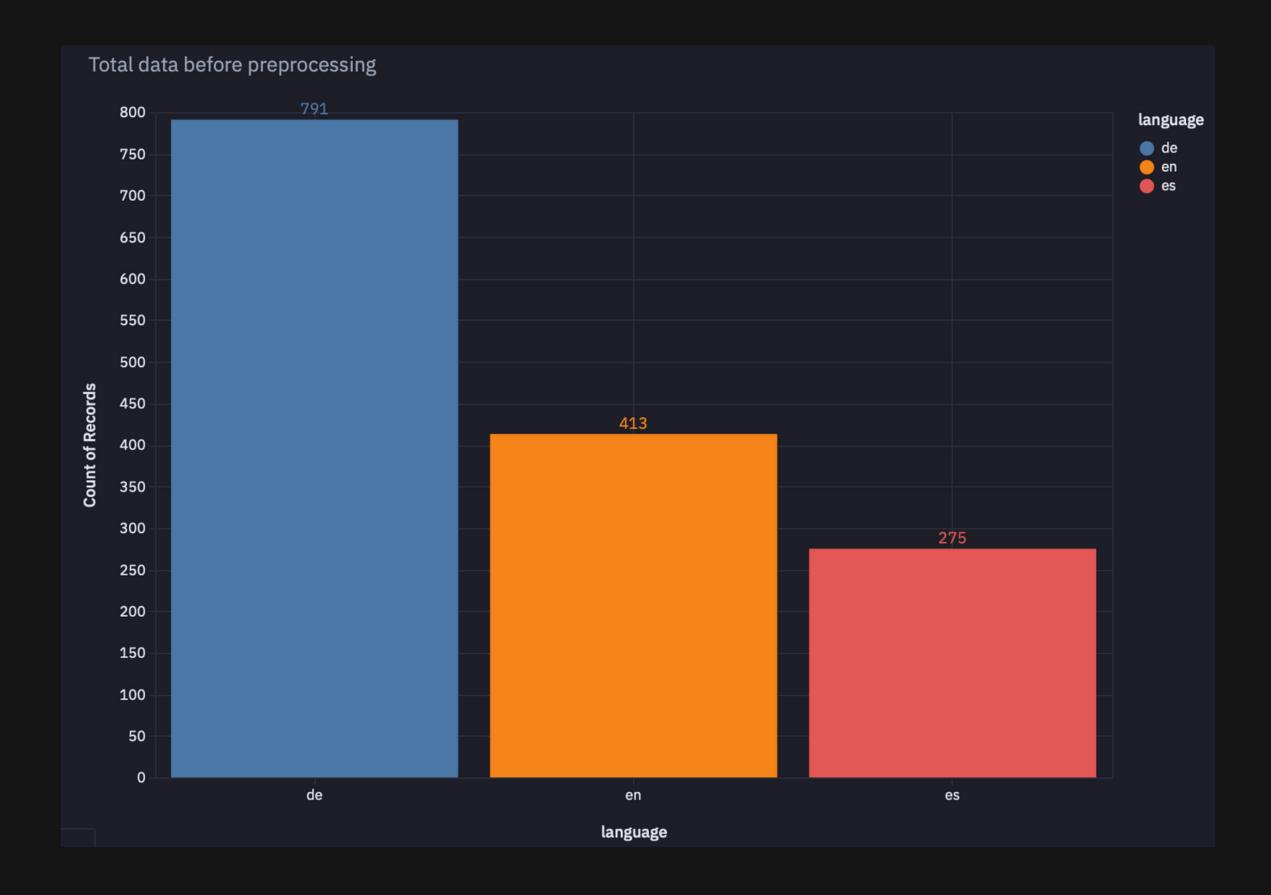


- Fan attraction
- Sponsor attraction
- Inform talent scouting process
- Inform line-up decisions
- Counteract blind-spots in news coverage
- Build a positioning strategy





# Data - before preprocessing



### **Total news 1479**

German 791 English 413 Spanish 275



# Data - before preprocessing

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Travers with a good punch away and he then pushes over James Garner's cupic.twitter.com/I4ahWu2PtM\n- NBC Sports Soccer (@NBCSportsSoccer) May 28, were very defensive from the start from Sean Dyche as he stated with a back five.CLC have gone 1-0 up against West Ham. With Everton drawing here at Goodison agains CHANCEE! Idrissa Gana Gueye is played in but his shot is tipped over. Should be 1-0 from the home fans. They want more attacking intent from their team. The home fans at the near post.KICK OFF! We are underway and it has been a tense start. Everton's ball.\\n WHAT AN ATMOSPHERE! Welcome to Goodison Park. It is so loud he pic.twitter.com/ko7Jm9wE16\\n- Joe Prince-Wright (@JPW\_NBCSports) May 28, 20 away end the Bournemouth fans are having a lovely time in the sun. Completely opportune. Team news is out and there are two changes for Everton as Conor Coady com Bournemouth are without captain and star goalkeeper Neto who misses out due to pe

Minimum length: 15
Maximum length: 1 578 671
Average length: 10 325.85

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they will stay up. Lose or draw and their safety is out of their hands. Get ready for an intense few hours.\\n \*Welcome to Goodison Park! \\nWhere the nerves are jangling, the sun is shining and the flares are plentiful. \\nAn intense, and pivotal, day awaits on the final day of the season for Everton. Can they stay up and secure a 70th straight top-flight season? #EFC #EVEBOU pic.twitter.com/xOjxY0gyF8\\n- Joe Prince-Wright (@JPW\_NBCSports) May 28, 2023Key storylines & in-form players to watchEverton have really been through it with injuries in recent weeks and the fact that Calvert-Lewin is once again struggling means that Dyche may play without a recognized striker on the final day. Defensively they have issues at full back but they have hung in there and the home crowd has inspired them on several occasions as they are within one win of safety. Bournemouth goalkeeper Neto has Dominic Solanke and Dango Ouattara at the other end of the pitch as there has been a really nice balance about the Cherries over the last few months as they stayed up without much stress in the end. In the reverse game in November Bournemouth beat Everton 3-0 to spark ugly scenes in the away end as the Everton fans turned on their players and demanded and were hugely disappointed with the display. Everton team news, injuries, lineupOUT: Seamus Coleman (hamstring), Dele Alli (groin), Ruben Vinagre (achilles), Andros Townsend (knee), Dominic Calvert-Lewin (thigh), Nathan Patterson (thigh), Tom Davies (thigh), Vitalii Mykolenko (thigh), Ben Godfrey (groin)\\nTEAM NEWS! #EVEBOU pic.twitter.com/cVWwDJPQSI\\n- Everton) May 28, 2023Bournemouth team news, injuries, lineupOUT: Antoine Semenyo (leg), Ryan Fredericks (calf), Junior Stanislas (other), Joe Rothwell (thigh), Hamed Traore (ankle), Marcus Tavernier (thigh), Neto (personal reasons)\\n Neto absent for personal reasons Billing fit and back in to start Ouattara also in the XI \\nOur line up for pic.twitter.com/3VuOAtaSrR\\n- AFC Bournemouth (@afcbournemouth) May 28, 2023 \\nLatest USMNT news\\n\\n\\n\\n USMNT upcoming schedule - Nations League, friendlies, Gold Cup \\n\\n\\n\\n\\n\\n\\n\\n\\n\\n Folarin Leicester were winning against West Ham which meant Everton were being relegated for the first time in the PL era and their hopes of extending their incredible top-flight active streak to 70-straight seasons were in real danger. Goodison was full of boos and images of doom at the final whistle.\\nBut Doucoure smashed home a stunning goal with just over 30 minutes to go to send Goodison Park wild as Bournemouth pushed hard for an equalizer late on but Everton held on and got the win they needed to stay up.\\nSean Dyche was a relieved man at the final whistle as Everton won five of his 17 games in charge to keep their pride top-flight history intact despite growing turmoil behind-the-scenes at the club.\\nPremier League news\\n\\n\\n\\n\\n\\n\\n\\n\\n Premier up with five at the back from the start and it was too negative. Dyche got it right though. All they needed was one loose ball to drop to the right onrushing central midfielder and it did in the second half as Doucoure hammered home. It was a brilliant finish in what wasn't a brilliant game. But Everton and Dyche don't care. With loads of injuries they found a way to get it done and the history books show that Everton have still never been relegated from the Premier League and only Arsenal have a longer active top-



# Data - before preprocessing

'{\'content\': "LIVERPOOL - Everton saved themselves from a first-ever Premier League relegation on the final day of the season, as Abdoulaye Doucoure was the hero with his stunning winner against Bournemouth. That sound you can hear is Everton fans exhaling. FULL MATCH REPLAYAt half time Leicester were winning against West Ham which meant Everton were being relegated for the first time in the PL era and their hopes of extending their incredible top-flight active streak to 70-straight seasons were in

and got the win they needed to stay up.[ MORE: How to watch Premier League in USA ]\\xa behind-the-scenes at the club. \\nPremier League news\\n\\n\\n\\n\\n\\n Premier Le needed was one loose ball to drop to the right onrushing central midfielder and it did in the way to get it done and the history books show that Everton have still never been relegated top level. Off the pitch there are financial issues to solve which could impact them next so again to Everton. They said that last season but look what happened. This time they have to Everton survived relegation from the Premier League on the final day of the season. #EFC have to repay the fansEverton's hero Abdoulaye Doucoure: Hard to explain emotionsStars good punches and clearances. Alex Iwobi: Showed real leadership and character to dig in de vs Bournemouth live, stream link and start timeKick off: 11:30am ET, Sunday\\nTV Channel: HAVE SURVIVED! FULL TIME: EVERTON 1-0 BOURNEMOUTH - It is party time here at Goodisc League relegation \( #EFC #EVEBOU \\nVideo highlights, analysis & more reaction → https: Vina.10 minutes of stoppage time. 10!Bournemouth have a free kick as the clock ticks into t there will be a lot of stoppage time.GOALLLL! Everton 1-0 Bournemouth - Goodison Park ha @USANetwork & @Peacock | #EVEBOU pic.twitter.com/aZPXb0kE25\\n- NBC Sports Bournemouth somehow scramble clear. The home fans can't believe it. The second half is Travers with a good punch away and he then pushes over James Garner's curling pic.twitter.com/l4ahWu2PtM\\n- NBC Sports Soccer (@NBCSportsSoccer) May 28, 2023E were very defensive from the start from Sean Dyche as he stated with a back five.CLOSE! Se have gone 1-0 up against West Ham. With Everton drawing here at Goodison against Bour CHANCEEE! Idrissa Gana Gueye is played in but his shot is tipped over. Should be 1-0 to Eve from the home fans. They want more attacking intent from their team. The home fans are dr at the near post.KICK OFF! We are underway and it has been a tense start. Everton's fans a WHAT AN ATMOSPHERE! Welcome to Goodison Park. It is so loud here. \ pic.twitter.com/ko7Jm9wE16\\n- Joe Prince-Wright (@JPW\_NBCSports) May 28, 2023The away end the Bournemouth fans are having a lovely time in the sun. Completely opposite at here. Team news is out and there are two changes for Everton as Conor Coady comes in f Bournemouth are without captain and star goalkeeper Neto who misses out due to persona they will stay up. Lose or draw and their safety is out of their hands. Get ready for an intens on the final day of the season for Everton. Can they stay up and secure a 70th straight top have really been through it with injuries in recent weeks and the fact that Calvert-Lewin is o the home crowd has inspired them on several occasions as they are within one win of safe balance about the Cherries over the last few months as they stayed up without much str demanded and were hugely disappointed with the display. Everton team news, injuries, lin Tom Davies (thigh), Vitalii Mykolenko (thigh), Ben Godfrey (groin) \\nTEAM NEWS! #EVEB Junior Stanislas (other), Joe Rothwell (thigh), Hamed Traore (ankle), Marcus Tavernier (1 #EVEBOU pic.twitter.com/3VuOAtaSrR\\n- AFC Bournemouth (@afcbournemout Balogun switches to USMNT \\n\\n\\n\\\n\\\n\\\n Christian Pulisic linked with Napo Leicester were winning against West Ham which meant Everton were being relegated for th images of doom at the final whistle.\\nBut Doucoure smashed home a stunning goal with up.\\nSean Dyche was a relieved man at the final whistle as Everton won five of his 17 game League preseason schedule: Dates, calendar, summer tours \\n\\n\\n\\n\\n\\n\\n\\n 10 th up with five at the back from the start and it was too negative. Dyche got it right though. A

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DATA CLEANED

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bodison Park wild as Bournemouth pushed hard for an equalizer late on but Everton held on his 17 games in charge to keep their pride top-flight history intact despite growing turmoil  $\ \$  \\n\\n 10 things we learned in the Premier League – Week 38 \\n\\n\\n\\n\\\n\\\n\\\n\\\n\\n th five at the back from the start and it was too negative. Dyche got it right though. All they asn't a brilliant game. But Everton and Dyche don't care. With loads of injuries they found a eak as they will be playing at England's top table next season, their 70th consecutive at the him the tools to rip things up and rebuild the squad. Just staying up like this can't happen size should never be in this situation.\\n From here at Goodison Park, this is the moment ay 28, 2023Sean Dyche: Everton proved they aren't a broken clubJordan Pickford: Toffees cored a beauty to be the hero and was brilliant in midfield. Mark Travers: Made some really ing Bournemouth chucked at Everton late on. Graphic via Fot Mob. com How to watch Everton n live analysis! – By Joe Prince-Wright at Goodison Park\\xa0THEY HAVE DONE IT! EVERTON t the win they needed against Bournemouth to save themselves from a first-ever Premier PW\_NBCSports) May 28, 2023SAVE! Jordan Pickford makes a fine save to deny a volley from bing deep. Bournemouth having a go. After Pickford was down for a wild getting treatment, offees ahead.\\nABDOULAYE DOUCOURE BLOWS THE ROOF OFF AT GOODISON PARK! \\n : icked on and it falls to Demarai Gray 6 yards out. He heads it straight at Travers. Then 0-0 Bournemouth – Half time here at their are loud boos from the home fans.SAVE! Mark ff the scoresheet just before the half!\\n $\,$ : @USANetwork & @peacock | #EVEBOU some poor Everton defending. Excellent from David Brooks there.You get the sense things the box. The atmosphere is very, very quite here.First, as it stands of today - Leicester City joing down!" from the Bournemouth fans in the away end. Everton's fans are stunned.BIG ed into the box but there isn't an Everton player anywhere near it. Huge roars of discontent positions.Demarai Gray with a half chance as he wriggles free but his shot/cross is cleared me good chances to whip it in from the right but the quality hasn't been there on the final ZQaeTyAs \\nMy thoughts on the scene here for Everton v Bournemouth \ #EVEBOU n fans just want to get this started. This has to be excruciating for them. Meanwhile in the hear a wall of noise approaching the stadium from every angle. Great atmosphere building njured Dominic Calvert-Lewin. Looks like Coady is at right back and McNeil is at left back. ng, the sun is shining and the flares are plentiful! The equation is simple for Everton: win and angling, the sun is shining and the flares are plentiful. \\nAn intense, and pivotal, day awaits Wright (@JPW\_NBCSports) May 28, 2023Key storylines & in-form players to watchEverton er on the final day. Defensively they have issues at full back but they have hung in there and . Solanke and Dango Ouattara at the other end of the pitch as there has been a really nice 3-0 to spark ugly scenes in the away end as the Everton fans turned on their players and nilles), Andros Townsend (knee), Dominic Calvert-Lewin (thigh), Nathan Patterson (thigh), ırnemouth team news, injuries, lineupOUT: Antoine Semenyo (leg), Ryan Fredericks (calf), rsonal reasons Billing fit and back in to start Ouattara also in the XI \\nOur line up for ming schedule - Nations League, friendlies, Gold Cup \\n\\n\\n\\n\\n\\n\\n Folarin nThat sound you can hear is Everton fans exhaling.\\nFULL MATCH REPLAY\\nAt half time ight active streak to 70-straight seasons were in real danger. Goodison was full of boos and hed hard for an equalizer late on but Everton held on and got the win they needed to stay noil behind-the-scenes at the club.\\nPremier League news\\n\\n\\n\\n\\n\\n\\n Premier n Premier League 2022-23 season recap: Video highlights, results, analysis\\nThey were set fielder and it did in the second half as Doucoure hammered home. It was a brilliant finish in I never been relegated from the Premier League and only Arsenal have a longer active top-



# Data - for topic clustering

### **DATA RAW**

{'content': 'Bayer Leverkusen muss im Kampf um den Einzug ins Halbfinale der Europa League auf den argentinischen Weltmeister Exequiel Palacios verzichten. Der Mittelfeldspieler, der beim 1:1 im Viertelfinal-Hinspiel gegen Union Saint-Gilloise mit einer Oberschenkelverletzung zur Pause ausgewechselt worden war, wurde nicht rechtzeitig für das Rückspiel in Brüssel fit. Er steht nicht im Kader. Am Mittwoch war Palacios ins Training zurückgekehrt.\nAmine Adli, der das Training am Mittwoch vorzeitig beenden musste, sitzt zumindest auf der Bank. ...



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## Data - for sentiment

### **DATA RAW**

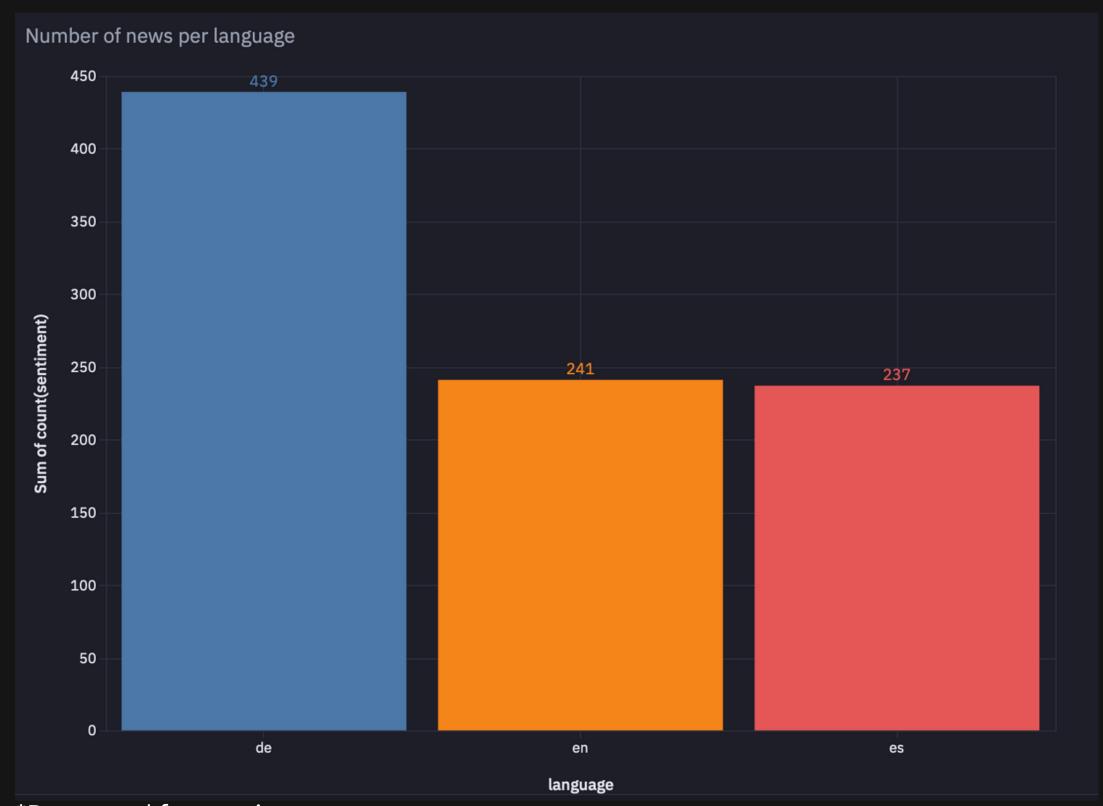
{\'content\': \'Football\\nFlorian Wirtz\\\'s goal for Bayer Leverkusen in the Europa League represents the next step on the road to recovery for the German teenager; Adam Bate was in the BayArena to see it and discuss the player\\\'s vast potential with sporting director Simon Rolfes\\nComment and Analysis\\n @ghostgoal\\nFriday 17 February 2023 00:01, UK\\nIt was the moment that Florian Wirtz had been waiting for, the moment that the BayArena had been waiting for, and when it came it was special. The first goal for Bayer Leverkusen's wunderkind since his long-term knee injury lit up their game against Monaco.\\nWirtz touched the ball nine times in scoring it. Ten if you included the toe-poked volley to team-mate Exequiel Palacios in the build-up. But those nine touches - the ball never moving more than a metre from his boot until the finish - showed why he is so special.\\nThat quick shift of the ball from one foot to the other had been seen minutes earlier when his previous dribble had been the catalyst for Moussa Diaby\\\'s equaliser. There is a calmness to his game, an ability to glide without breaking stride, that only the best possess.\\nIt felt cruel on Wirtz that it was not the winne...



ten if you included the toe poked volley to team mate palacios in the build up



# Data - after preprocessing



\*Data used for sentiment

**Total news 1479** 

German 791

English 413

Spanish 275

**Total news: 917** 

German: 439 (47%)

English: 241 (42%)

Spanish: 237 (13%)

Overall loss: 36.19%



# Approach - text clustering

on DE data



APPROACH

Clustering (KMeans) and topic modeling (LDA) Cluster and topic size 2-15

CHALLENGE

Small Clusters → very general not precise

Many clusters → very specific and topics double

RESULT

Cluster size of 8 and aggregate into 3 central topics

Bundesliga News

Game Situations and Match
Performance

Europa League





# Approach - text clustering

Bundesliga News

Game Situations and Match Performance

Europa League









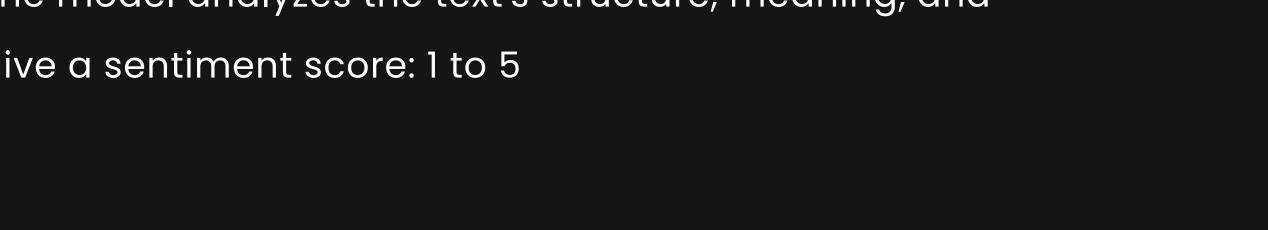
# Approach - sentiment

### **MODEL USED**

- Selected model nlptown/bert-base-multilingual-uncased-sentiment
  - multilingual & uncased
  - BERT based
  - Neural network layers

on DE, EN, ES data

 The model analyzes the text's structure, meaning, and give a sentiment score: 1 to 5







# Approach - Wrap up

Preprocessing per language Take relevant data

### WORD FREQUENCY

- Normalization: Stemmatization
- Representation: TfidfVectorizer

### SENTIMENT ANALYSIS

- Normalization: Tokenization
- Representation: Transformerbased
- Models: multilangual & BERT per language on diffrent datasets

### TEXT CLUSTERING

- Normalization: Stemmatization
- Representation: TfidfVectorizer
- Label data
- Models: KMeans, LDA

Evaluate accuracy

Create Dashboard in HEX, including matchdata

### WHY WAS IT CHOSEN?

- requirements from news data
- three languages

- interest in text clustering from Bayer04
- limited time



# Results - overall





# Performance evaluation - sentiment

	f1-score	support
DE	0.57	30
EN	0.47	30
ES	0.43	30
Overall	0.49	90

### Manual labeling

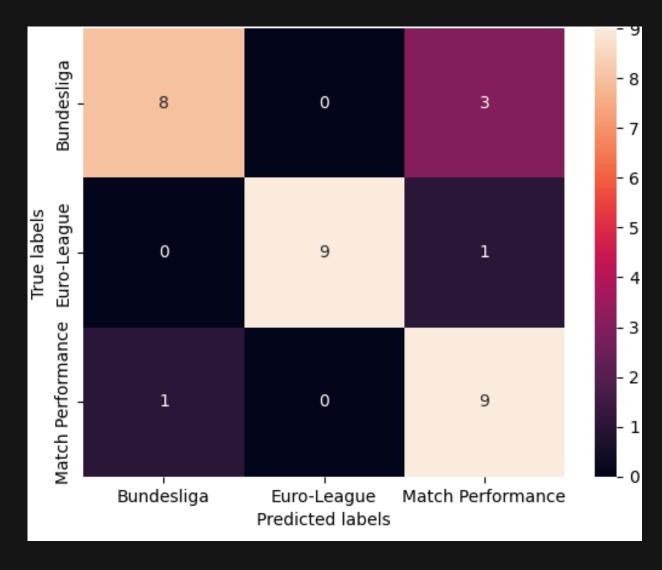
### Mapping scores changed



	precision	recall	T1	support
negativ (1)	0.41	0.58	0.48	24
neutral (2-4)	0.52	0.73	0.61	33
positiv (5)	0.60	0.18	0.28	33
Accuracy and overall			0.49	90



# Performance evaluation - text clustering



### Manual labeling

	precision	recall	f1	support
BL-News	0.89	0.73	0.80	11
Europa-Leage	1.00	0.90	0.95	10
Situation & Perf.	0.69	0.90	0.78	10
Accuracy and overall			0.84	31



<sup>\*</sup>Results form kMeans



# Next Steps for Bayer04 - sentiment

### IMPROVE MODEL PERFORMANCE

- Fine tune model
- Try different models e. g. VADER or NewsSentiment
- Combine multiple sentiment models to create an ensemble

### IMPROVE EVALUATION RELIABILITY

- Calculate confidence intervals
- see for both





# Next Steps for Bayer04 - text clustering

- Perform for all languages
- Try diffrent normalisation e.g. Tokenization
- Try different embeddings
- Try diffrent models e.g. Transformers
- Look at overlapping clusters/topics
- Gather more specific topics

### FOR BOTH:

- Get more and better data from the API
- Balance out the classes
- Pre-Label more datapoints in order to archive more accurate accuracy scores





# Achievements in respect to motivation



- Fan attraction
- Sponsor attraction
- Motivation for player & team
- Inform talent scouting process
- Reproduce good sentiment
- Counteract bad sentiment
- Support players with high media attention



### **SENTIMENT**

Having a good sentiment performance in all three languages

Showing differences between players

Showing changes over time, specifically related to matches



# Achievements in respect to motivation



- Fan attraction
- Sponsor attraction
- Inform talent scouting process
- Inform line-up decisions
- Counteract blind-spots in news coverage
- Build a positioning strategy

### **TOPICS**

- Identifiying text cluster in German data
- Showing differences between players
- Showing changes over time, specifically related to matches
- Comparing topics and sentiment
- Get more specific clusters to have more actionable insights



# THANK YOU FABIAN AND FELIPE FROM BAYER 04!



# THANK YOU!

Questions and Feedback are welcome

Team 4: Joana, Kevin, Gala