

# Applied Artificial Intelligence Lab



Kick-off Meeting

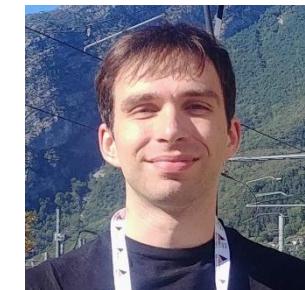
# Who is involved?

## Professorship for Applied Machine Learning

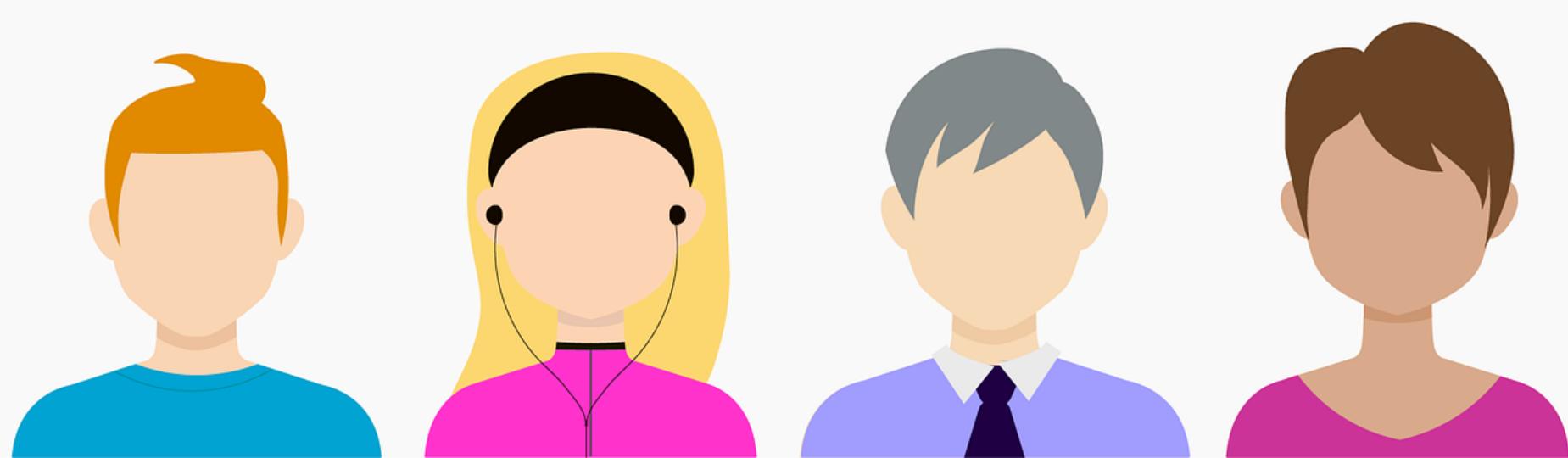
Prof. Dr. Florian Lemmerich



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# Who are you?



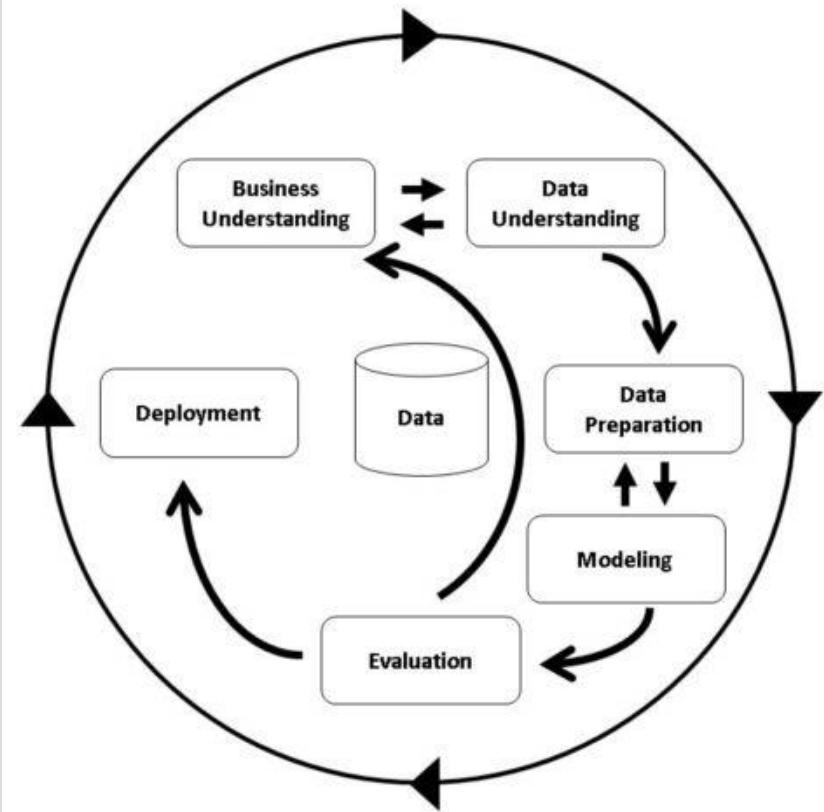
# *Goal of this lab*

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- Bringing AI into action
- „practical problems“
- Pragmatic: Try to make it work
- Very different solution approaches

# *The goal of this lab*

- Apply your skills on an ML/AI problem
  - **Teams of two or three students**
  - One problem per team
- Communication of results
  - Presentation
  - Report



# (Tentative) Dates

Date	
13/10/25	Introductory session
20/10/25	Working session
27/10/25	Introductory presentations
03/11/25	Working session
10/11/25	Working session
17/11/25	Working session
24/11/25	Working session
01/12/25	Working session
08/12/25	Working session
15/12/25	Working session
22/12/25	Working session
12/01/26	Working session
19/01/26	Working session
26/01/26	Final presentation
02/02/26	Final presentation
15/02/26	Report deadline

- Working Session = we all meet here
  - We give advice
  - You take turns in giving update presentations
  - In addition to working on your own
- Regular progress expected
- Registration via Campusportal (if selected)

- Graded individually
- What is graded?
  - Quality of Solution:
    - NOT model performance
    - Appropriate solution, clean implementation, innovativeness
    - Systematic evaluation
  - Code
  - Presentations
  - Report
  - Final individual discussion
- The documented code and analyzed data will be submitted as well
- Everyone codes, presents, writes!
- Bonus points: short presentation of a useful library/model

- Introductory presentations:
  - 15 minutes presentation
  - 10 minutes discussion
- Short update presentations:
  - Every week, alternating between groups
  - Update: no slide / 1 minute per group
  - **Once:** Present a specific tool / method / algorithm (up to 20 mins)
- Final presentation:
  - 30 minutes presentation
  - 15 minutes questions
- Contents:
  - Overview about your work and results
  - Understandable by everyone!
- Don't underestimate the effort it takes to craft an effective presentation!
  - [How to prepare a presentation – YouTube](#)

- Expectation: You work in the lab every week
- If you miss one/two weeks: No issue

- Give an overview about your task/challenge
  - Data
  - Evaluation
  - First steps
- Outline potential problems and approaches

- Style of a scientific workshop paper
  - [Example 1](#)
  - [Example 2](#)
- Template will be uploaded in StudIP
- Up to 10 pages (including figures; references and appendix do not count towards page limit)
- One paragraph per student to highlight their personal contribution
- Late submissions by at most two days will be accepted, **but affects grade negatively**

- Course has 6 ETCS
- 180 working hours **per student**
- **12 hours per week and per student**
- Only three hours in class
- Plan a full working day for additional work
- Continuous effort expected (Update presentations)

- Work on your own (as a group)!
- You can (and should!) use code snippets and libraries from others, but cite your sources!
- Plagiarism will result in failing the course without warning.

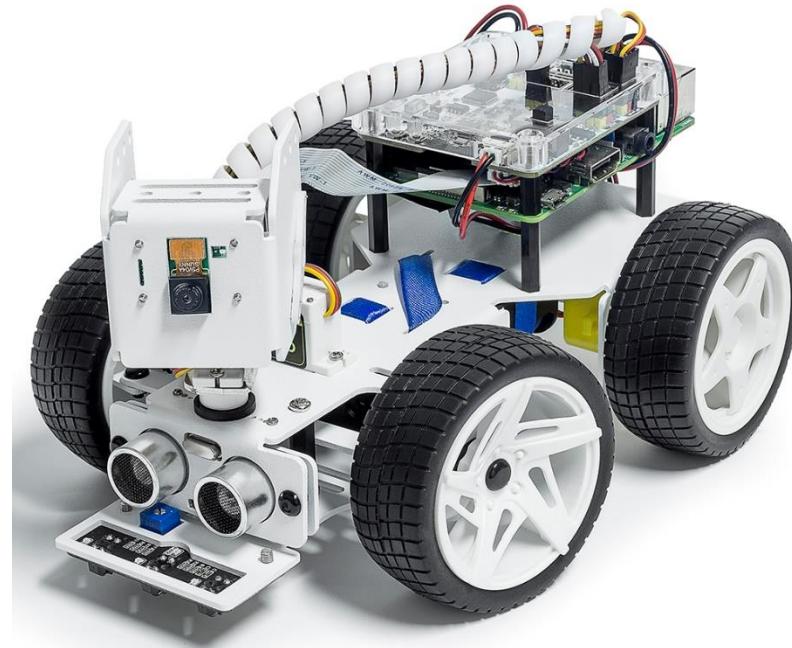
- Teams of 2 students (3 as an exception)
- Selection of topics
  - We go through the topics one-by-one
  - Today: Do research and form teams
  - Until Wednesday, 14:00h:  
Send an email with your ranked top-3 topics per team
- Later on you can change topics only if you find a partner to switch! → Use the forum!
- If you notice that you do not want to participate anymore
  - You can leave in the first week without consequences
  - Consider there are fellow students on the waiting list

- Kaggle & Google Colab (both have GPU options)
- (Access to university resources based on your project)
- Subsample dataset to work on your own computer

- Detect Body Gestures with a camera/webcam
- Decode it into discrete actions
- Run a game with it



- “self-driving car”
- PiCar X
- Get it to run
- Let it move through given checkpoints

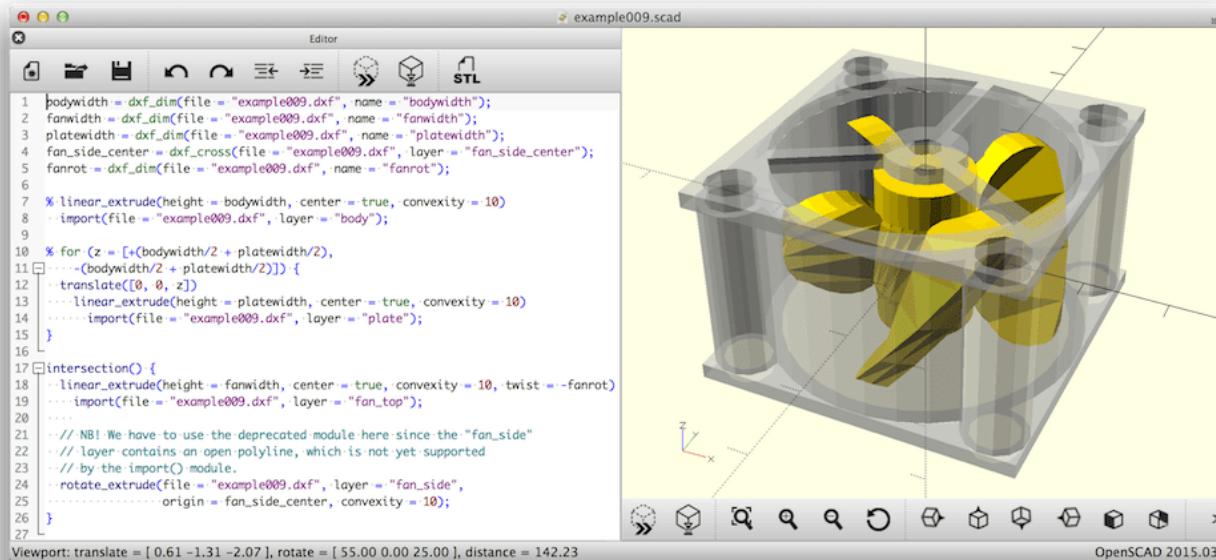


<https://docs.sunfounder.com/projects/picar-x/en/latest/>

- Goal:
- Assist in the usage of overleaf
- Be creative with functions
- E.g.: paste an arxiv-link in overleaf, press hotkey
  - Agent looks for a reference, pastes it into the bib file

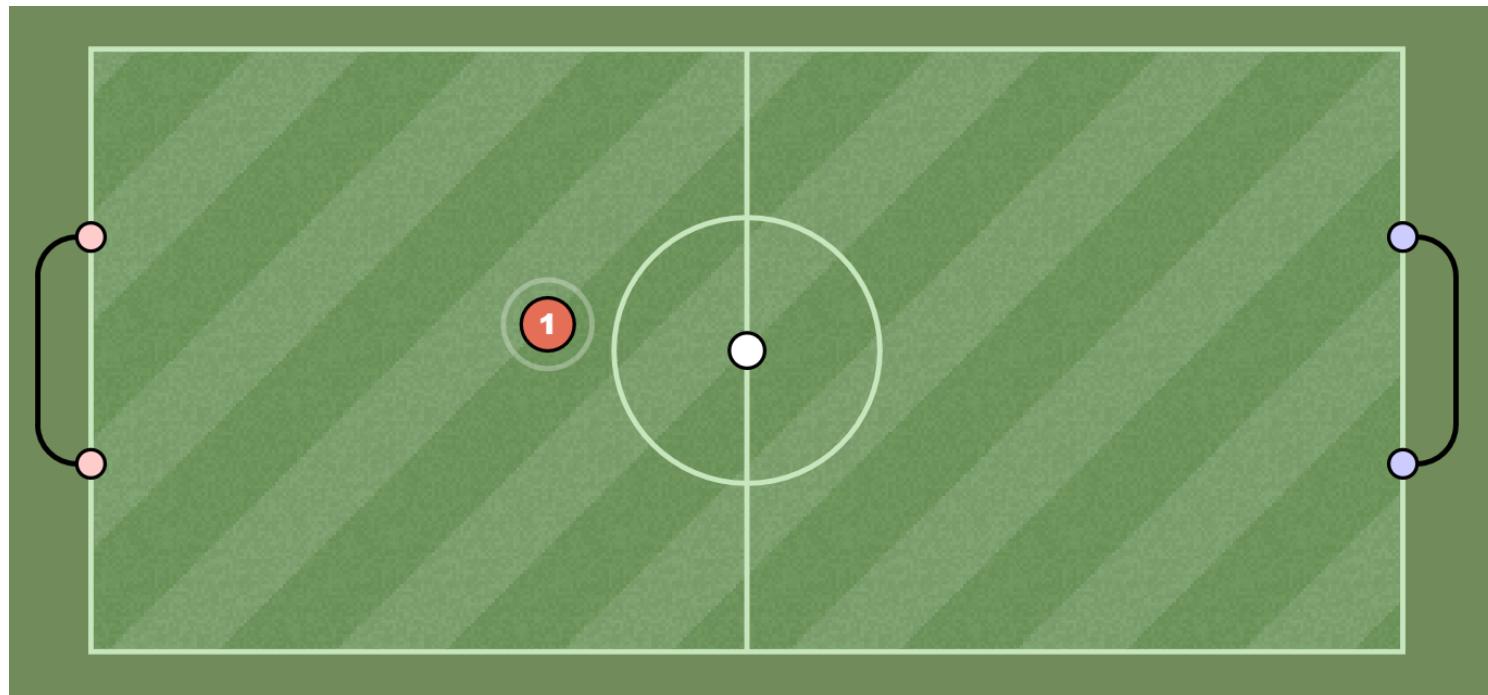
# LLM for Creating OpenScad scripts

- Train an LLM agents to write OpenScad scripts



- Get Visual Feedback from results and incorporate

- Create an AI for the game „haxball“
- Simple soccer client
- Multiplayer

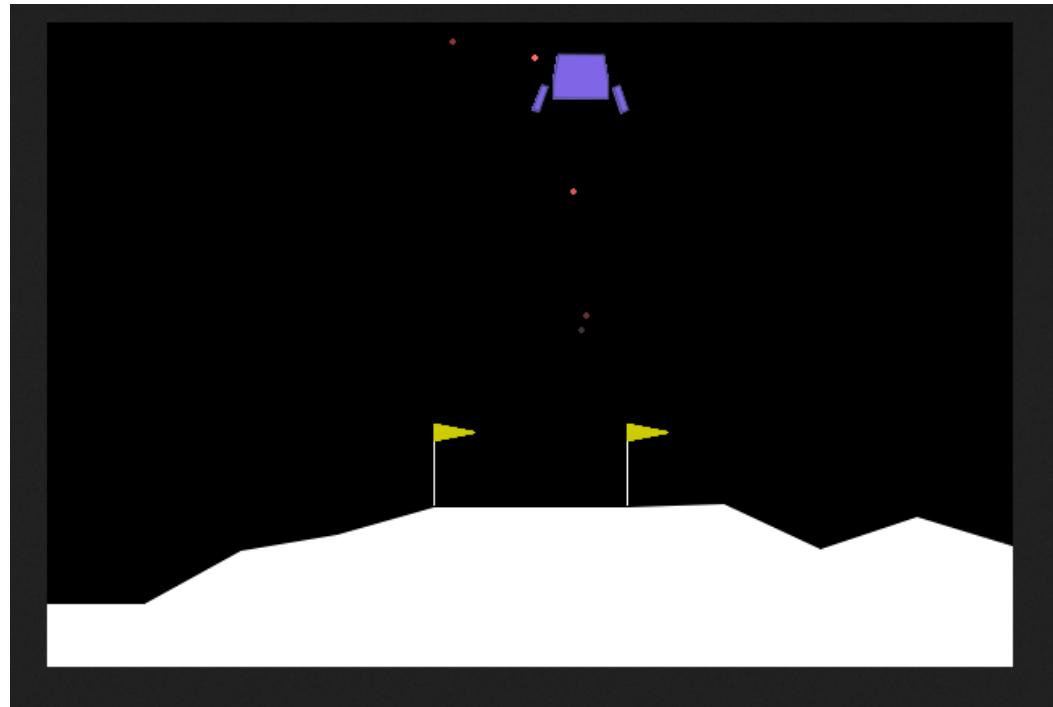


- Create a database for perfect play!
- Pick a game of your choice!

- Train an LLM to let it play the game of Diplomacy well
- Negotiation Game
- Plan strategically
- Judge opponents!



- Create environments via commands
- Caption events
- Predict outcomes



# Get cooking suggestions based on an image of ingredients

## Input

Easy (?)



Hard (?)



Modern vision-language models can identify ingredients pretty well and can make suggestions right away.



I have these ingredients. Suggest some dishes I can make

Qwen3-VL-235B-A22B

You have a fantastic, versatile collection of ingredients perfect for Mediterranean, Middle Eastern, or North African-inspired dishes! Here are several delicious options you can make:

1. Classic Hummus

The ultimate chickpea dip.

Ingredients you have:

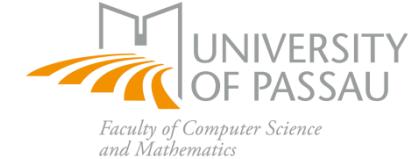
- Chickpeas (cooked)
- Garlic
- Lemon (juice)

Massive collections of recipes on the web on sites like [chefkoch.de](http://chefkoch.de) or [seriouseats.com](http://seriouseats.com)

These recipes may be of higher quality than what a model generates (at least can be filtered by rating)

Goal: combine VLM capabilities with information from the web to give good recipe suggestions

# **AI for form/report validation/prefill**



# Input

# Example: business trip expense report

<b>Risikokosten</b> können nur bei Abrechnung innerhalb von <b>6 Monaten</b> erstattet werden.	
Ansonsten sind auch Abschlagszahlungen zurückzurufen.	
<b>Antrag auf Genehmigung einer</b> <input type="checkbox"/> Dienstreise <input type="checkbox"/> Fortbildungseins	
<b>an Ihnen:</b>	<b>bei (Datum)</b>
<b>Seitens (Name), Telefonnr. (Telefon, E-mail o. Mobiltelefon)</b>	<b>Keine Unterlagen benötigt</b>
<b>Reisezeitraum</b> (Datum, Uhrzeit)	
<b>Beginn</b>	<b>h</b>
<b>Ende</b>	<b>h</b>
<b>Dienstreise</b> <input type="checkbox"/> <b>Reisekosten</b> <input type="checkbox"/> <b>Zeiterstattung</b> <input type="checkbox"/>	<b>Reisekosten nicht möglich</b> <input type="checkbox"/>
<b>Antragsteller/Antragstellerin</b> (Name, Vorname, Anschrift)	<b>Reisezeitraum</b> (Datum, Uhrzeit)
<b>Erklärung der Reiseziele/Pausen:</b> <b>Gedächtnisschutz</b> (je Reisezeitraum)	
<b>Mitreisende</b> (Name, Vorname)	
<b>Begründung für die Notwendigkeit der Teilnahme mehrerer Personen an der Reise:</b>	
<b>Verkehrsmitteil</b>	
<input type="checkbox"/> Deutsche Bahn (Bahnkarte Nr. 7200206) <input type="checkbox"/> private Kfz ohne Anhänger <input type="checkbox"/> private Kfz aus Folgendem triftigen Grund <input type="checkbox"/> private Kfz mit Anhänger <input type="checkbox"/> Dienstwagen <input type="checkbox"/> Mietfahrzeug <input type="checkbox"/> Flugzeug <input type="checkbox"/> Mietfahrtzug <input type="checkbox"/> Begleitender	
<input type="checkbox"/> Reisezeit mit regelmäßig verkehrenden Linienverkehr <input type="checkbox"/> Mietfahrt von _____ weiterer Dienstfahrzeugen <input type="checkbox"/> Mietfahrt von mehr als 10 kg oder sperrigen Gepäck <input type="checkbox"/> Sonstiges	
<b>Risikokosten</b>	
<b>Es wird eine Reise in Höhe von</b> <input type="checkbox"/> € <b>antraggestellt</b> (ggf. Kostenübersicht anfügen)	
<input type="checkbox"/> Finanzierung zu Lasten des Projektes (ggf. Kostenstellen): <input type="checkbox"/> Finanzierung aus DR 40 (vomamt TG)	
<b>Auf Risikokosten wird verzichtet</b>	
<b>Der Verzicht erfolgt teilweise</b> <input type="checkbox"/> vollständig <input type="checkbox"/> teilweise	
<b>Risikokosten werden von dritter Seite erstattet</b> <input type="checkbox"/> Unterkunft <input type="checkbox"/> Verpflegung	
<b>Während der Reise werden von Amts wegen unerlässlich geachtet</b> <input type="checkbox"/> ja <input type="checkbox"/> nein	
<b>Bei Reise in Nicht-EU-Staaten wird versichert, dass die exportationsfördernden Maßnahmen eingehalten werden, welche die Reise ermöglichen</b> <input type="checkbox"/> ja <input type="checkbox"/> nein	
<b>Ich versichere die Richtigkeit und Vollständigkeit meiner Angaben. Die Hinweise zum Datenschutz halte ich gelesen.</b>	
<b>Ich erkläre auf Dienstgefühl (nur Personen/Professionen ausschließen)</b> <input type="checkbox"/> Dienststelle nicht berührt (weiter Verteilung, Verlagerung nach Ausland)	
<b>Die Dienststelle ist nicht betroffen</b> <input type="checkbox"/> ja <input type="checkbox"/> nein <b>Die Dienststelle kann keine Verlagerung mehr Lehranstellungen erforderlich</b> <input type="checkbox"/> ja <input type="checkbox"/> nein <b>Die Termine wurden der Dekanatskommission bestätigt</b> <input type="checkbox"/> ja <input type="checkbox"/> nein	
<b>Zurück zu Antragsteller/Antragstellerin</b>	
<b>Die Reise wird</b> <input type="checkbox"/> genehmigt <input type="checkbox"/> mit <input type="checkbox"/> nicht genehmigt <input type="checkbox"/> genehmigt, wenn <input type="checkbox"/> nicht erforderlich	
<b>Dienstreise</b> <input type="checkbox"/> <b>Reisekosten</b> <input type="checkbox"/> <b>Fortbildungskosten</b> <input type="checkbox"/> <b>Bahn</b> <input type="checkbox"/> <b>Flugzeug</b> <input type="checkbox"/> <b>Mietfahrtzug</b> <input type="checkbox"/> <b>Dienst-Kfz</b> <input type="checkbox"/> <b>agrarische Produkte</b> <input type="checkbox"/> <b>vorläufige Mittagskosten</b> <input type="checkbox"/> <b>Kfz (Brigde-Gründe für die Kfz-Dienstreise werden anerkannt)</b> <input type="checkbox"/> <b>Mitarbeiter</b> <input type="checkbox"/> <b>mit</b>	
<b>Haushaltspunkt: Buchungsstelle:</b> <input type="checkbox"/> Kostenstellen:	
<b>Pausa:</b> den _____	
<b>Unterschrift des Dienstgeführers:</b> _____ <b>Informationen zur Verarbeitung Ihrer Daten und zu Ihren Rechtebestimmungen:</b> <a href="#">Datenschutzerklärung</a> <b>Haftungsbeschränkung:</b> <a href="#">Pauschal- und Fristaufschluss</a> <a href="#">Datenschutzerklärung zu Prebedingungen</a>	

<b>Antrag auf Erstattung der Reisekosten</b>		<b>Empfangen am:</b>
Abreitungsreise/Reise (Name, Vorname)	Strasse, Haus-Nr.	Postleitzahl, Ort
Name, First Name	Street, 123	94032, Passau
Bankverbindung - IBAN	BIC ABCDEFG1	
DE12 3456 1234 1234 1234 0000		
Eigener Haushalt am Geschäftsort	<b>Für Reiseende ohne Beisetzen oder Beschäftigungserlaubnis an der Universität Passau</b>	
<input type="checkbox"/> ja <input checked="" type="checkbox"/> nein	Studentenumfrage (Steu-E)	
<b>L Anreise</b>	<b>Durchreise/Anreise:</b>	
Beginn der Reise um <b>21.4.25,</b> Reise um <b>21.4.25,</b> von der <b>Dienststelle</b>	Fahrtenkosten: a) mit Flugzeug b) mit Auto c) mit Zug d) mit Schiff	
Vereinbarungen mit dem Reiseziel:	<b>Bei Überreichung des Höchstentgelts</b> <b>Autorenkosten</b> <b>Reisekosten</b> <b>Erstattung mit dem Höchstentgelt</b>	
<b>VI. Aufenthalts- und Gestaltungsdauer</b>	<b>Entfernungskosten:</b>	
Beginn der Reise um <b>21.4.25,</b> Ende der Reise um <b>24.4.25,</b> Reisezeit um <b>38.00 Uhr</b>	Euro Km Euro Km Euro Km Euro Km Euro Km Euro Km	
Vereinbarungen mit dem Reiseziel:	a) Pkw b) Fahrrad c) Sonstige	
Gehört die Reise zu einer <b>Privatekz.</b>	<b>Wohnung:</b>	
<input type="checkbox"/> ja <input checked="" type="checkbox"/> nein	Dienststelle	
<b>Rückreise</b>	<b>Wohnung:</b>	
Beginn der Reise um <b>21.4.25,</b> Ende der Reise um <b>24.4.25,</b> Reisezeit um <b>00.00 Uhr</b>	Dienststelle	
Vereinbarungen mit dem Reiseziel:	<b>Entfernungskosten:</b>	
Ankunft an der <b>Wohnung:</b>	Euro Km Euro Km Euro Km Euro Km Euro Km Euro Km	
<b>IV. Auslandreise</b>	<b>Summe</b>	
Hinweise:	Ort, Datum und Uhrzeit der erreichten Grenzüberschreitung/Landungen	
Rückreise:	Shanghai, 29.4.25, 10 Uhr München, 4.5., 8.30 Uhr	
<b>V. Zuweisungen (siehe Verzicht von Tagessätzen ausfüllen)</b>	<b>Wohnung:</b>	
Wohnung in einem dieser Orte:	<b>Fahrtenkostenentlastung:</b>	
<input type="checkbox"/> ja <input checked="" type="checkbox"/> nein	a) in Höhe von <b>100,-</b> b) in Höhe von <b>100,-</b> pro Tag privat entwölkt	
unbenannte Reiseziele:	Frühstück <input type="checkbox"/> nein <input checked="" type="checkbox"/> ja, am/vom 22.4.-23.4.-26.4.	
unbenannte Reiseziele:	Mittag <input type="checkbox"/> nein <input checked="" type="checkbox"/> ja, am/vom	
Mahlzeiten im Flugzeug	Frühstück <input type="checkbox"/> nein <input checked="" type="checkbox"/> ja, am/vom 22.4.-25.	
<input type="checkbox"/> ja <input checked="" type="checkbox"/> nein	Abend <input type="checkbox"/> nein <input checked="" type="checkbox"/> ja, am/vom 21.4.-3.5.	
In Tagessatzgröße erhalten:	Übernachtung <input type="checkbox"/> nein <input checked="" type="checkbox"/> ja, am/vom	
	Mittag <input type="checkbox"/> nein <input checked="" type="checkbox"/> ja, am/vom	
	Abend <input type="checkbox"/> nein <input checked="" type="checkbox"/> ja, am/vom	
<b>VI. Begründungen jeglicher Art (gegenübergestellt auf gekennzeichnetem Blatt):</b>		
siehe beigefügtes Blatt		
<b>VII. Haftungserklärung:</b>		
Ich habe einen Abschrift erhalten <input type="checkbox"/> ja <input checked="" type="checkbox"/> nein und zeige in Höhe von <b>Euro 100,-</b>		
Ich versichere pflichtgemäß die Richtigkeit meiner Angaben. Zahlen Sie bitte auf oben genanntes Konto. Die Hinweise zum Datenschutz habe ich gelesen.		
<b>IV. Dokument</b>	<b>Unterschrift:</b>	
Für Verpfändung ihrer Daten und für Wissensweitergabe sowie für die Nutzung unserer Dienstleistungen, Personen von A-Z wie Dienst- und Fachkundberatung, Dienstleistungserbringung zu bestimmen		

Lots of bureaucracy requires manual checking of forms.

For a business trip: are all fields filled with reasonable values? Does the hotel cost 10000€? Does the travel

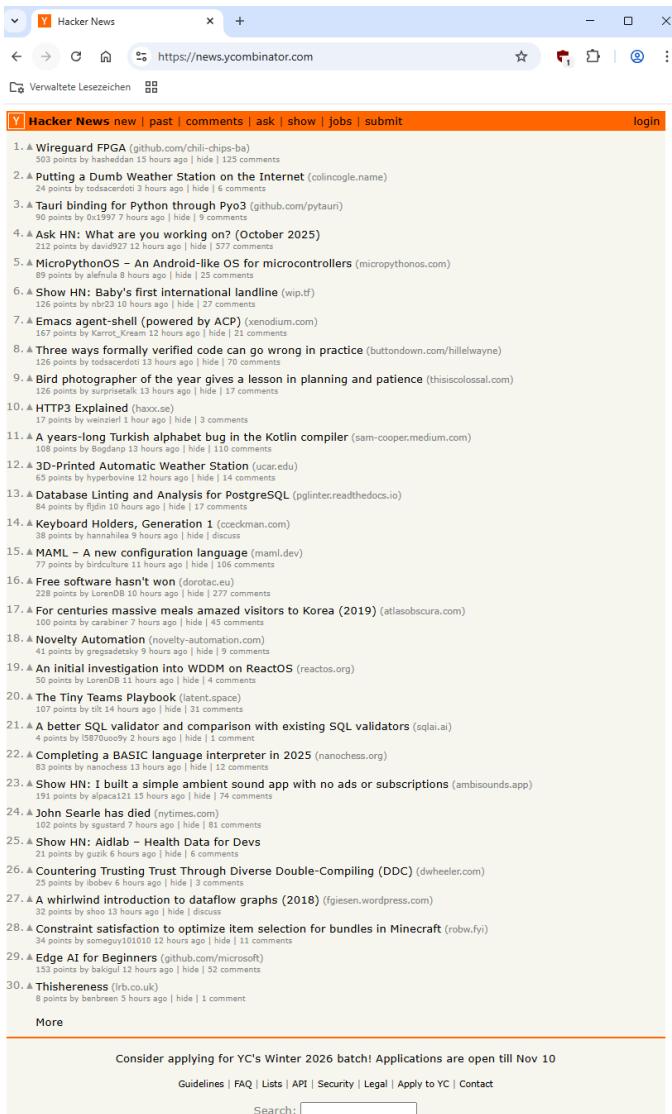
Completely digitalized process would be ideal, but may be difficult.

Middle ground: use LLM to read pdf and do a pre-check.

- Detect anomalies
  - Do background tasks like web search to check validity of information

Goal: use AI to automate manual checking of reports and forms

# AI sentiment analysis on hackernews



A screenshot of a web browser displaying the Hacker News homepage at https://news.ycombinator.com. The page lists 30 recent submissions, each with a title, author, points, and timestamp. The submissions cover various technical topics like programming languages, tools, and software. At the bottom of the page, there is a call to action for YC's Winter 2026 batch, links to guidelines and FAQ, and a search bar.

Hacker News new | past | comments | ask | show | jobs | submit login

1. ▲ Wireguard FPGA (github.com/chili-chips-ba)  
503 points by hashedan 15 hours ago | hide | 125 comments

2. ▲ Putting a Dumb Weather Station on the Internet (colincogole.name)  
24 points by todacerdot 3 hours ago | hide | 6 comments

3. ▲ Tauri binding for Python through Pyo3 (github.com/pytaur)  
90 points by 0x1997 7 hours ago | hide | 9 comments

4. ▲ Ask HN: What are you working on? (October 2025)  
212 points by david927 12 hours ago | hide | 577 comments

5. ▲ MicroPythonOS – An Android-like OS for microcontrollers (micropythonos.com)  
89 points by leflelfu 8 hours ago | hide | 25 comments

6. ▲ Show HN: Baby's first international landline (wip.tf)  
126 points by nbr23 10 hours ago | hide | 27 comments

7. ▲ Emacs agent-shell (powered by ACP) (xenodium.com)  
167 points by Karrot, Kream 12 hours ago | hide | 21 comments

8. ▲ Three ways formally verified code can go wrong in practice (buttondown.com/hillewayne)  
126 points by todacerdot 13 hours ago | hide | 70 comments

9. ▲ Bird photographer of the year gives a lesson in planning and patience (thisiscolossal.com)  
126 points by surpriseball 13 hours ago | hide | 17 comments

10. ▲ HTTP3 Explained (havocoe)  
17 points by weinert 1 hour ago | hide | 3 comments

11. ▲ A years-long Turkish alphabet bug in the Kotlin compiler (sam-cooper.medium.com)  
108 points by Boudang 13 hours ago | hide | 110 comments

12. ▲ 3D-Printed Automatic Weather Station (cucac.edu)  
65 points by hyperbeam 12 hours ago | hide | 14 comments

13. ▲ Database Linting and Analysis for PostgreSQL (pglinter.readthedocs.io)  
84 points by tyler10 10 hours ago | hide | 17 comments

14. ▲ Keyboard Holders, Generation 1 (coekman.com)  
83 points by manmihale 8 hours ago | hide | discuss

15. ▲ MAMI – A new configuration language (mami.dev)  
77 points by birculture 11 hours ago | hide | 106 comments

16. ▲ Free software hasn't won (dotract.eu)  
228 points by LorenDB 10 hours ago | hide | 277 comments

17. ▲ For centuries massive meals amazed visitors to Korea (2019) (atlasobscura.com)  
100 points by carlsinger 7 hours ago | hide | 45 comments

18. ▲ Novelty Automation (novelty-automation.com)  
41 points by greggadams 9 hours ago | hide | 9 comments

19. ▲ An initial Investigation into WDDM on ReactOS (reactos.org)  
50 points by LorenDB 11 hours ago | hide | 4 comments

20. ▲ The Tiny Teams Playbook (latent.space)  
107 points by tit414 10 hours ago | hide | 131 comments

21. ▲ A better SQL validator and comparison with existing SQL validators (sql.ai)  
4 points by ISB700uoy2 2 hours ago | hide | 1 comment

22. ▲ Completing a BASIC language interpreter in 2025 (nanochess.org)  
83 points by nanochess 13 hours ago | hide | 12 comments

23. ▲ Show HN: I built a simple ambient sound app with no ads or subscriptions (ambisounds.app)  
191 points by alpacal21 15 hours ago | hide | 74 comments

24. ▲ John Searle has died (nytimes.com)  
102 points by sgurard 7 hours ago | hide | 81 comments

25. ▲ Show HN: Aidlab – Health Data for Devs  
21 points by guzik 6 hours ago | hide | 6 comments

26. ▲ Counteracting Trust Through Diverse Double-Compiling (DDC) (dwheeler.com)  
25 points by Robbe 6 hours ago | hide | 3 comments

27. ▲ A whirlwind introduction to dataflow graphs (2018) (fjiesen.wordpress.com)  
32 points by shoo 13 hours ago | hide | discuss

28. ▲ Constraint satisfaction to optimize item selection for bundles in Minecraft (robw.fyi)  
34 points by someguy101012 12 hours ago | hide | 111 comments

29. ▲ Edge AI for Beginners (github.com/microsoft)  
153 points by bakigui 12 hours ago | hide | 52 comments

30. ▲ Thishereness (irb.co.uk)  
8 points by benbenben 5 hours ago | hide | 1 comment

More

Consider applying for YC's Winter 2026 batch! Applications are open till Nov 10

Guidelines | FAQ | Lists | API | Security | Legal | Apply to YC | Contact

Search:

- Forum and news site for a technical audience
- AI often reaches front page
- Track how sentiment of LLMs evolves over time
  - Coding ability, speed, etc. („aspects“)
  - Separated by models
- Use their API to get comments
- Build a dashboard to track sentiment

# *Not sure how to evaluate the projects?*

- Take a screenshot of the slide and use the LLM of your choice to give you some more information
- For example, ask it about likely needed technologies, frameworks, libraries, or potential challenges.

- Body Gestures control of a simple game
- PiCar X -> self-driving car.
- Overleaf-bib-assistant
- Dota 2: bot
- Diplomacy Game AI
- Create a (Kalah) Endgame Database
- 2D-Physics-Engine
- LLM for Creating OpenScad scripts
- Haxball AI
- AI for form/report validation/prefill
- Get cooking suggestions based on an image of ingredients
- AI sentiment analysis on hackernews
- AI-assisted policy navigator