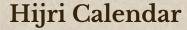


## Calendars



#### Gregorian Calendar

January, February, March...



Muharram, Safar, Rabi Al-Awwal...





#### Hebrew Calendar

Tishrei, Cheshvan, Kislev...

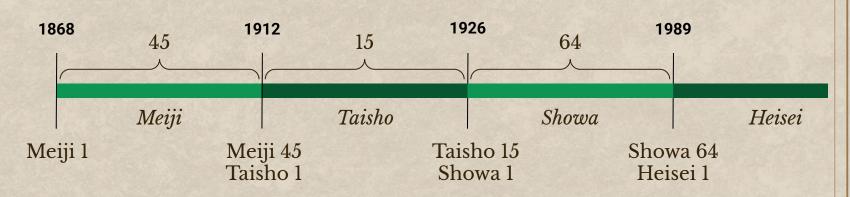
#### Japanese Calendar



7

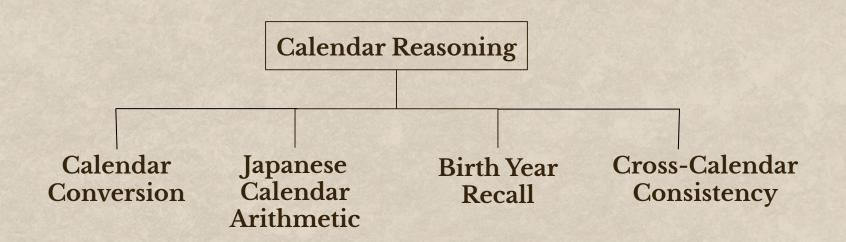
# Japanese Wareki Calendar

### Gregorian Calendar Years



Japanese Wareki Eras and Years

# Gregorian-Wareki Reasoning



# Language Models



- LLM-JP-3-13B
- Sarashina2-13B
- Swallow-13B
- Swallow-MS-7B
- LLaMA3-Swallow-8B



- LLaMA-2-7B
- LLaMA-2-13B
- Mistral-7B
- LLaMA3-8B

### 1. Calendar Conversion

Accuracy-Announcer Functions

Japanese to Gregorian

$$\frac{1}{N}\sum_{i=1}^{N}\mathbf{1}(\hat{\mathbf{y}}_i=y_i)$$

Gregorian to Japanese

$$\frac{1}{N}\sum_{i=1}^{N}\mathbf{1}(Ei = \hat{E}_i \wedge x_i = \hat{x}_i)$$

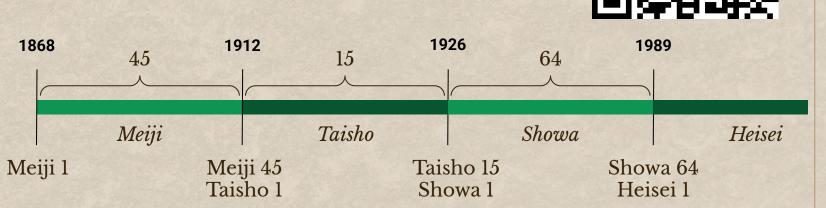
### 1. Calendar Conversion



Question: What year in the Japanese calendar is 10 years after Meiji 44?

Link to Mentimeter: <a href="https://www.menti.com/al2zeieuj88p">https://www.menti.com/al2zeieuj88p</a>

**Quiz Code: 7531 8685** 



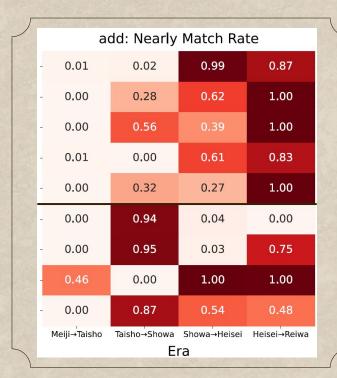
Ratio of outputs with the correct era

$$\frac{1}{N}\sum_{i=1}^{N}\mathbb{1}(\hat{\mathbf{E}}_i=E_i)$$



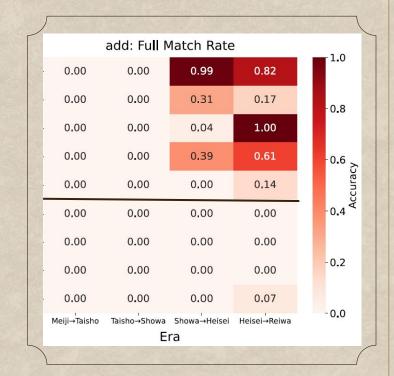
Ratio of outputs of a margin of error of a year

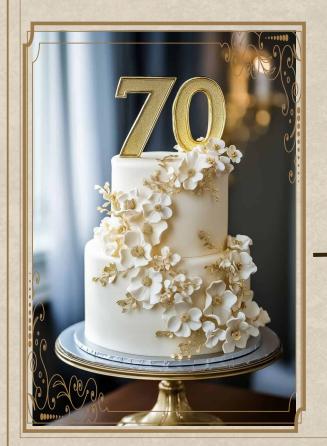
$$\frac{1}{N} \sum_{i=1}^{N} \mathbb{1}(|G(E_i, x_i) - G(\hat{E}_i, \hat{x}_i)| \le 1)$$



Ratio of outputs with the correct exact year

$$\frac{1}{N}\sum_{i=1}^{N}\mathbf{1}(Ei = \hat{E}_i \wedge x_i = \hat{x}_i)$$

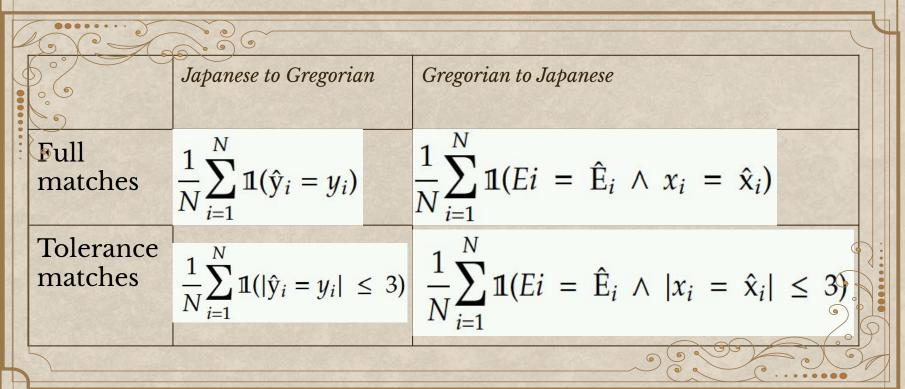


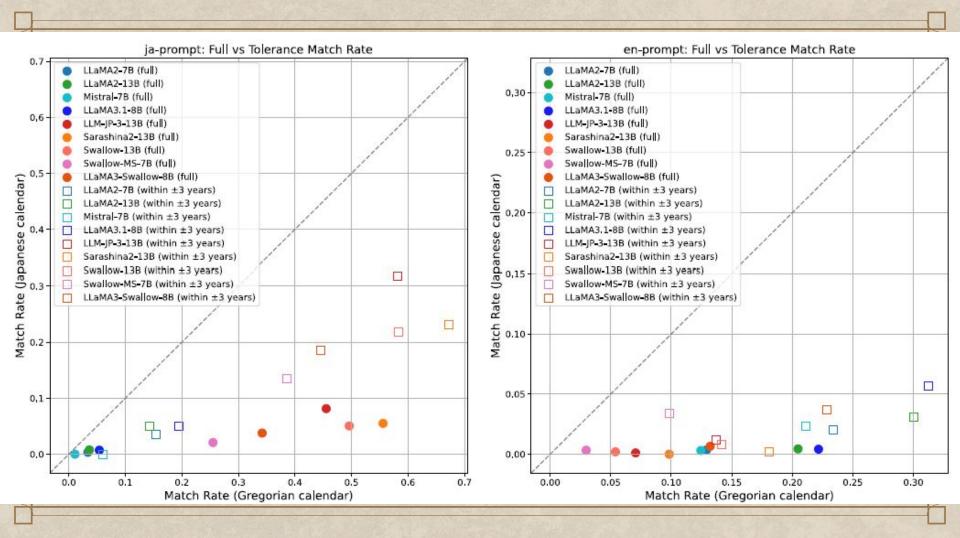


# 3. Birth Year Recall



## 3. Birth Year Recall





# 4. Cross-Calendar Consistency





Heisei 13

= 5

1932

#### CALENDARIVM GREGORIANVM

Orbi Christiano vniuerso à Gregorio XIII. P. M. propositium. Anno M. D. LXXXII.

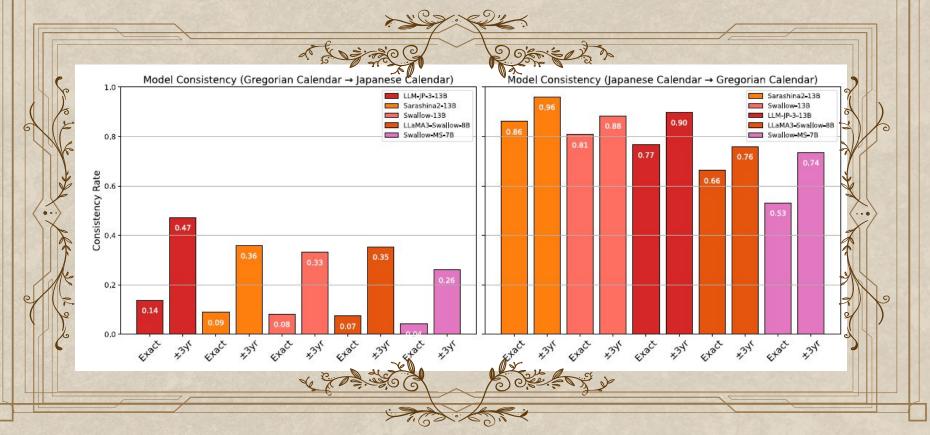
-0250

#### GREGORIVS EPISCOPVS

AD PERPETVAM REI MEMORIAM.

NTER or suiffimes Pattoralis officie noftri curas, eapofiremanonest, vi que ala-NT E R francisco escribe ata oppor mente escribe escribe escribe escribe conceito sul dependencia referentajam, illa ad finem optatum, Des zdintore perducunare. Same enddem Concily Patres, same ad religiosm containe non Brestary quoque curam adungerent , tempore tamen exclusi rem taramene ipfins Concessi decreto ad anctoritation & indicium Romani Pontificia resulterant. Duo auton firenterio pracipaccontinentur; quoram unum preces, laudesane dininas festis, prof. stague dubm perfoluendas completitur, elterum pertimet ad annuos Pafella, folterunque ex copendentum recurfue, Solu . or Lunn metumetiendes: Atque illud quidem felicies esperlationis Pius V pra lecejor aufter abjalaendum turante, atque edidit. Hot vero quod m marum extent legitimism Calendary refittationem, ismdina Romann Pontificibus pradecefferibus nofirm of laptus tentatum est, verum abfolia, es a d'exitum perdues ad bos refenetempus non poture quod rutsnes omend such & liendary, que a califium motuum pertiti proponebantur, propter mannas, & fereinextricabiles difficultates, quas hacufino di contadatio femper hibrat peque perennes erant, neque section the section of the section o nearly meters and insert nobicliber a dilectophic antonio i cho arrinto. O medicine doctore, quen quen dam Alarjus cus germanus frater conjeripjerat, in quo per nonum quendam Epactarum Cyclum ab co except runn, & ad certam tofins aures namers normanidore lam, seque ed quameanque anni folaru m egutudinem accommodatum omnia, quain Calendario collapfa funi, conflantiratione, & feculis omenthus dur stura. Screft sus posse oftendet, an Calendarium tofum multi anguam mutationi in posse numenovitumi eth valesum. Nasam bane reftuuende Calendary rationem enique volumint comprebention ad Circificano, Principes, celébrioresque animerfitates pancos ante anno mifimon, atres. grecongin so commented communication annium confilio perfecteurs, illicam, que maxime optabansus contor des respondissent, coram nos omnium consensione adducts, vivos ad Cilendary emendattonem adhionimus in alma Vehe harum rerum peritifimos, quos longeante ex primarys Christians tenom addinations; in a fine 1 the instantive mappertupines, quart sunge and experiments constituent with a verticant and individual constituents and includes and include and includes and include and includes and Calendary perfectionem maxime perimere.

# 4. Cross-Calendar Consistency



### **Ultimate Words**

- Can Language Models Handle a Non-Gregorian Calendar?
- What purpose can this paper serve?





# References



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  3.
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#### **Images**

• Birth Certificate, Birthday Cake (70th), Birthday Cake (90th), Disintegrating Clock, Flag of Japan, Gregorian Calendar, Japanese Calendar, Union Jack

