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Tamil Numeral Calendar Converter: A Web-Based Gregorian to Tamil Calendar Conversion System

Keerthy E K, Karthikeyan D, Jeevarathinam T, Anuprabha R
[1]Department of Computer Science with Artificial Intelligence and Data Science, KPR College of Arts Science and Research, Coimbatore, Tamilnadu, India
Corresponding author: auroalgora47@gmail.com

Abstract

The Tamil calendar is an important cultural calendar system used to represent dates, months, festivals, and traditional observances in Tamil communities. However, many digital applications present dates primarily in the Gregorian format and do not provide a simple interface for representing Tamil calendar information together with traditional Tamil numerals. This paper presents a web-based Tamil Numeral Calendar Converter that accepts a Gregorian date as input and produces a corresponding Tamil calendar representation. The system uses a deterministic date-mapping approach based on Tamil month reference ranges and converts decimal digits into Unicode Tamil digits for display. The prototype is implemented using HTML5, CSS3, and Vanilla JavaScript, with emphasis on responsive design, simple interaction, and cultural presentation. The work demonstrates how traditional calendar information can be represented in a lightweight browser-based application without machine learning or external frameworks. The proposed system can serve as a foundation for future extensions involving year-specific astronomical calculations, festival information, localization, and richer Tamil calendar services.

Keywords—Tamil calendar; Gregorian calendar; Tamil numerals; date conversion; Unicode; web application; cultural heritage

I. INTRODUCTION

Digital calendars have become a common part of everyday computing, but calendar interfaces often prioritize the Gregorian system and provide limited support for regional calendar traditions. The Tamil calendar is a solar calendar whose twelve months are traditionally named Chithirai, Vaikasi, Aani, Aadi, Aavani, Purattasi, Aippasi, Karthigai, Margazhi, Thai, Maasi, and Panguni. These months broadly correspond to periods from mid-April through mid-April of the following year. [1], [2]

In addition to month names, the Tamil script contains dedicated Unicode digits from Tamil digit zero through Tamil digit nine. Unicode also defines Tamil number symbols such as ten, one hundred, and one thousand. These characters make it possible for a browser-based application to present numerical values in Tamil script without relying on image-based text. [3]

The motivation for the present work is to create a simple digital bridge between the Gregorian date familiar to modern users and a Tamil calendar representation. The proposed application accepts a Gregorian date, determines its Tamil month and date using a reference-based mapping, and displays the numerical date using Tamil Unicode digits. The approach is intended to be understandable, lightweight, and suitable for a college project demonstration.

The main objectives are: (1) to provide a clear Gregorian date input interface; (2) to map the input to a Tamil calendar month and day; (3) to represent the resulting date using Tamil numerals; (4) to provide a responsive and culturally appropriate web interface; and (5) to establish a foundation for future year-specific calendar calculations and additional Tamil calendar information.

II. RELATED WORK

Existing online Tamil calendar resources generally provide month information, festival dates, and calendar views, while general-purpose date APIs and programming languages provide facilities for handling Gregorian dates. JavaScript, for example, provides date objects and methods for representing and manipulating dates in web applications. [4] The Unicode Standard separately defines Tamil digits and calendrical symbols, enabling native digital representation of Tamil numerical characters. [3]

Educational resources also describe the twelve Tamil months and their approximate Gregorian periods, generally placing Chithirai around mid-April to mid-May and Panguni around mid-March to mid-April. [2] Such resources are useful for building a reference table, but an exact calendar implementation may require year-specific solar transition data. Therefore, the present prototype distinguishes between a reference-based month mapping and a future astronomical calculation layer.

Unlike systems that focus on general panchangam information, the proposed application concentrates on one specific interaction: Gregorian date input followed by Tamil month, Tamil day, and Tamil numeral output. The emphasis is therefore on accessibility, Unicode-based representation, and a clear user experience.

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III. PROPOSED SYSTEM

A. System Architecture

The system follows a simple client-side architecture consisting of an input layer, date processing layer, Tamil calendar mapping layer, numeral conversion layer, and presentation layer. The user enters a Gregorian date through an HTML date input. JavaScript validates the input and processes the date. A reference table containing Tamil month boundaries is then used to identify the corresponding Tamil month and day. Finally, each decimal digit in the resulting day value is replaced with its Tamil Unicode equivalent before the output is rendered in the webpage.

B. Date Mapping Method

The prototype uses a deterministic reference-based method rather than machine learning. The mapping layer stores the twelve Tamil months in their traditional order and associates each month with an approximate Gregorian interval. The selected Gregorian date is compared with these intervals, after which the offset from the beginning of the Tamil month is used to derive the displayed Tamil day. Because actual solar transition times can vary by year, this method is treated as a prototype mapping mechanism rather than a complete astronomical calendar engine.

C. Tamil Numeral Conversion

Tamil Unicode digits are defined from U+0BE6 to U+0BEF. The mapping used by the application is: 0→௦, 1→௧, 2→௨, 3→௩, 4→௪, 5→௫, 6→௬, 7→௭, 8→௮, and 9→௯. [3] For example, a displayed day value of 30 can be rendered as ௩௦. This operation is a character substitution process and does not require an artificial intelligence model.

D. User Interface and Implementation

The interface is implemented using HTML5 for structure, CSS3 for visual presentation, and Vanilla JavaScript for date processing. The design uses a Tamil cultural visual theme with a warm background, brown and saffron accents, rounded cards, clear typography, responsive spacing, and a prominent conversion control. The layout is designed to remain usable on desktop, tablet, and mobile screens.

TABLE I. TAMIL MONTH REFERENCE ORDER

No.	Tamil Month	Approx. Gregorian Period
1	Chithirai	Apr–May
2	Vaikasi	May–Jun
3	Aani	Jun–Jul
4.	Aadi	Jul–Aug
5.	Aavani	Aug–Sep
6.	Purattasi	Sep–Oct
7.	Aippasi	Oct–Nov
8.	Karthigai	Nov–Dec
9.	Margazhi	Dec–Jan
10.	Thai	Jan–Feb
11.	Maasi	Feb–Mar
12.	Panguni	Mar–Apr

IV. DATA COLLECTION AND PROCESSING

A. Reference Data

The prototype requires a reference dataset containing the twelve Tamil month names and their corresponding Gregorian periods. The month order and approximate periods are based on published Tamil calendar descriptions. For a production-level system, the reference dataset should be expanded with year-specific Tamil month start dates obtained from a reliable calendar or astronomical source. This separation between reference data and processing logic makes the application easier to update.

B. Input Validation

The web form accepts a valid Gregorian calendar date. Empty, malformed, or unsupported values are rejected before conversion. The validation step prevents the processing layer from producing meaningless output and provides immediate feedback to the user.

C. Processing Flow

The conversion sequence is: Gregorian date input → date validation → month interval identification → Tamil month selection → day offset calculation → Tamil digit substitution → formatted result display. This sequence is deterministic for a given reference dataset and input date.

V. RESULTS AND DISCUSSION

A. Functional Output

The prototype demonstrates the intended conversion workflow. After the user selects a Gregorian date and activates the conversion control, the interface presents the mapped Tamil month and day and a Tamil-numeral representation of the day. For example, a day value of 30 is displayed as ௩௦. The output is generated directly in the browser and does not require a server-side machine learning service.

B. User Interface

The user interface separates input and output areas so that the conversion result can be understood quickly. The responsive design allows the same interaction to be used on different screen sizes. Tamil Unicode characters are rendered as text, which improves accessibility and allows the content to be copied as normal digital text.

C. Limitations and Discussion

The primary limitation of the current prototype is that approximate month ranges cannot by themselves guarantee the exact Tamil date for every Gregorian date

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and every year. Tamil month boundaries are related to solar transitions, so a production system should use year-specific transition data or a validated astronomical calculation. Consequently, the current implementation should be described as a reference-based prototype, not as a fully authoritative astronomical calendar engine.

The use of Unicode Tamil digits is comparatively stable because the character definitions are standardized. This makes the numeral-conversion layer independent from the calendar-mapping layer and allows the latter to be improved without changing the display mechanism. [3]

VI. CONCLUSION

This paper presented a web-based Tamil Numeral Calendar Converter that connects a Gregorian date input with a Tamil calendar representation and Tamil Unicode numeral output. The system is implemented with standard web technologies and uses a deterministic reference-based mapping process. The prototype demonstrates that regional calendar information and traditional numerical characters can be incorporated into a lightweight, responsive digital interface.

The work also identifies an important distinction between a simple calendar prototype and an exact calendar engine. While reference ranges are suitable for demonstrating the conversion workflow, accurate year-specific results require validated transition data. Addressing this limitation is the main technical direction for future development.

VII. FUTURE SCOPE

Future work can extend the system with year-specific solar transition data, validated Tamil month start dates, Tamil year information, festival and holiday data, multilingual interface options, downloadable calendar views, and offline support. The system could also be integrated with a structured calendar database or an astronomical calculation library so that the mapping becomes more precise across different years. Additional testing with known calendar dates can be used to validate the conversion layer before deployment.

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